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FINAL

HEALTH AND SAFETY PLAN

WOODBRIDGE RESEARCH FACILITY
VIRGINIA

NOVEMBER 1994

Prepared for:

U.S. ARMY ENVIRONMENTAL CENTER
Aberdeen Proving Ground, Maryland 21010

Prepared By:

THE EARTH TECHNOLOGY CORPORATION
1420 King Street, Suite 600
Alexandria, Virginia 22314

Under Contract Number DAAA15-91-D-0009, Delivery Order 0001

Printed on Recycled Paper

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Site Inspection and Remedial Investigation activities are proposed at the Woodbridge Research Facility in Woodbridge, Virginia. A Health and Safety Plan was prepared to outline procedures that must be followed by all personnel while working on the site. The Health and Safety Plan includes the identification of the following: responsibilities of all personnel that are involved with the proposed activities; health and safety programs to be implemented such as medical monitoring; potential hazards that may be encountered while performing the proposed activities; and applicable monitoring, personal protective equipment, decontamination, and site control requirements. The Health and Safety Plan also includes an emergency contingency plan to establish the appropriate response actions for emergency situations.

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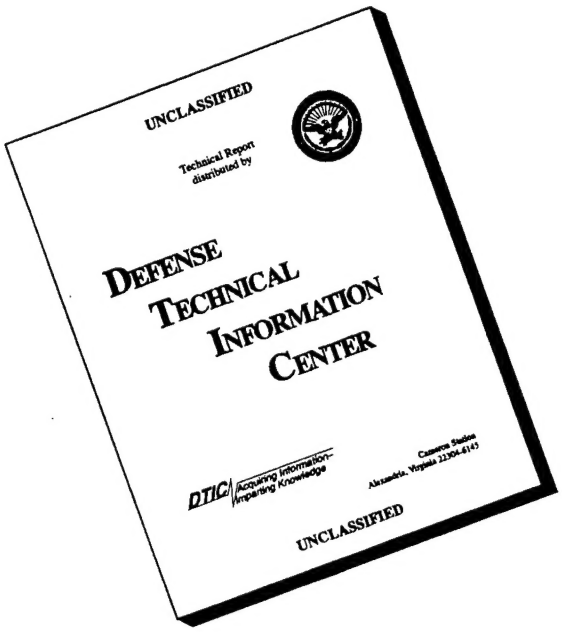

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REVIEW AND APPROVALS

By my signature below, I indicate that I have read and approved this Health and Safety Plan and that it reasonably and accurately describes the work, the hazards, and the protection for this project. Furthermore, this Health and Safety Plan and the work performed according to this Health and Safety Plan conform to regulatory requirements and The Earth Technology Corporation procedures.

Program Manager
The Earth Technology Corporation

Tom Hastings	Signature	11/28/94
		Date

Project Manager
The Earth Technology Corporation

Kevin McCreanor	Signature	28 NOV 94
		Date

Corporate Health and Safety Officer
The Earth Technology Corporation

Glen J. Barrett	Signature	11/29/94
		Date

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LIST OF ILLUSTRATIONS

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LIST OF ABBREVIATIONS & ACRONYMS

AAIH	American Academy of Industrial Hygiene
ABIH	American Board of Industrial Hygiene
ACGIH	American Conference of Governmental Industrial Hygienists
AIHA	American Industrial Hygiene Association
ANSI	American National Standards Institute
APR	Air purifying respirator
AREE	Area Requiring Environmental Evaluation
ATS	Army Transmitting Station
B of M	Bureau of Mines
BOD	Biological oxygen demand
BNA	Base-Neutral and Acid-Extractable Compounds (see PNA)
bp, BP	Boiling point
BTEX	Benzene, toluene, ethylbenzene, and xylenes
CAA	Clean Air Act of 1970
CAAA	Clean Air Act Amendments of 1990
CBC	Complete blood count
CDC	Centers for Disease Control
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
CGI	Combustible gas indicator
CHEMTREC	Chemical Transportation Emergency Center
CMA	Chemical Manufacturers Association
CNS	Central Nervous System
CPR	Cardiopulmonary resuscitation
CRC	CRC Press, publishers of scientific reference books
CRC	Contamination reduction corridor
CRZ	Contamination reduction zone
DECON	Decontamination
DFM	Diesel fuel, marine
DOD	Department of Defense
DOL	Department of Labor
DOT	Department of Transportation
EERU	Environmental Emergency Response Unit
EMP	Electromagnetic pulse
EOL	End-of-life
EPA	Environmental Protection Agency
ERCS	Emergency Response Cleanup Services, under EPA contract
ERT	Environmental Response Team
ESLI	End-of-service-life indicator
eV	Electron-volt
FAPR	Full-face air-purifying respirator
FEF	Forced expiratory flow

LIST OF ABBREVIATIONS & ACRONYMS

Continued

FID	Flame ionization detector
FM	Factory Mutual
fp, FP	Flash point
FRC	Functional residual capacity
FVC	Forced vital capacity
GC	Gas chromatograph, gas chromatography
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	High efficiency particulate air
IDLH	Immediately dangerous to life or health
IP	Ionization potential
IR	Infrared radiation
IRP	Installation Restoration Program
IUPAC	International Union of Pure and Applied Chemists
LC_{50}	Lethal concentration killing 50% of the population
LD_{50}	Lethal dose killing 50% of the population
LEL	Lower explosive limit
LFL	Lower flammable limit
LNAPL	Light Non-aqueous Phase Liquid
LOP	Level of Protection
MAC	Maximum acceptable concentration (obsolete)
MEFR	Maximum expiratory flow rate
MEK	Methyl ethyl ketone
mg/m^3	Milligrams per cubic meter
MIRAN™	Foxboro's trade name for series of miniature infrared analyzers
MSHA	Mine Safety and Health Administration
MUC	Maximum use concentration
MUL	Maximum use limits
MVV	Maximum voluntary ventilation
NAS	National Academy of Science
NCP	National Oil and Hazardous Substances Contingency Plan
NEC	National Electrical Code
NEC	Not elsewhere classified
NFI	No further investigation
NFPA®	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health
NOAA	National Oceanic and Atmospheric Administration
NOS, n.o.s.	Not otherwise specified
NRC	Nuclear Regulatory Commission
NTP	Normal temperature and pressure
OEL	Occupational Exposure Limit
OLAC	Operating Location AC
ORM	Other regulated material. Various classes, such as ORM-A, ORM-E, etc.

LIST OF ABBREVIATIONS & ACRONYMS

Continued

ORM	OSHA Reference Method for airborne asbestos measurement
OSC	On scene commander
OSHA	Occupational Safety and Health Administration
OVA	Organic Vapor Analyzer
OVM	Organic Vapor Monitor
PAPR	Powered air-purifying respirator
PAT	Proficiency Analytical Testing
PCB	Polychlorinated biphenyl
PDS	Personal decontamination station
PF	Protection factor
PID	Photoionization detector
PNA	Polynuclear Aromatic Hydrocarbons
POV	Privately owned vehicles
PPE	Personal protective equipment (includes clothing and respiratory protection)
ppm	Parts per million
PRP	Potentially responsible party
PRL	Potential release location
PVC	Polyvinyl chloride
QA/QC	Quality assurance/quality control
RBC	Red blood count
RCRA	Resource Conservation and Recovery Act of 1976
REL	Recommended exposure limit (NIOSH)
REMFIT	Remedial action/field investigation team, under EPA contract
RI	Remedial Investigation
RV	Residual volume
SAP	Sampling and Analysis Plan
SAR	Supplied air respirator
SARA	Superfund Amendments and Reauthorization Act of 1986
SCBA	Self-contained breathing apparatus
SES	Safety and Environmental Services
SI	Site Inspection
SOP, SOPs	Standard operating procedures
SOSG, SOSGs	Standard operating safety guidelines
SSO	Site Safety Officer
STEL	Short term exposure limit (ACGIH)
STLC	Soluble Threshold Limit Concentration
STP	Standard temperature and pressure
SVOC	Semivolatile Organic Compound
TAT	Technical Assistance Team, under EPA contract
TCA	Trichloroethane (methyl chloroform)
TCE	Trichloroethylene
TFH	Total fuel hydrocarbons

LIST OF ABBREVIATIONS & ACRONYMS

Continued

TLC	Total lung capacity
TLV®	Threshold limit values (ACGIH)
TPH	Total Petroleum Hydrocarbon
TTLC	Total Threshold Limit Concentration
TWA	Time weighted average
UEL	Upper explosive limit
UFL	Upper flammable limit
UL	Underwriters Laboratories
USACE	United States Army Corps of Engineers
USAEC	United States Army Environmental Center
USCG	United States Coast Guard
U.S. DOL	United States Department of Labor
U.S. EPA	United States Environmental Protection Agency
UST	Underground Storage Tank
UV	Ultraviolet radiation
VOC	Volatile organic compound
WEEL	Workplace environmental exposure level (AIHA)
WRF	Woodbridge Research Facility

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1.0 INTRODUCTION

1.1 OBJECTIVE

The Earth Technology Corporation (TETC) will perform a Site Inspection (SI)/Remedial Investigation (RI) at the 22 Areas Requiring Environmental Evaluation (AREEs) located on the Woodbridge Research Facility (WRF), Woodbridge, Virginia. The Work Plan prepared for this project provides details and rationale for the proposed environmental sampling program, the data quality objectives, and the objectives of the project. Potentially contaminated areas were identified through an Enhanced Preliminary Assessment for the WRF (Weston, 1992).

The SI/RI is being conducted at WRF by Earth Technology as part of the U.S. Army Installation Restoration Program (IRP). The proposed SI/RI activities are presented in the Work Plan (TETC, 1993). The purpose of the SI/RI is to characterize the soil and groundwater at each AREE to accurately define what, if any, contamination exists at WRF as a result of past U.S. Army activities.

1.2 SITE AND FACILITY DESCRIPTION

WRF occupies approximately 579 acres in the town of Woodbridge, in Prince William County, Virginia (see Figure 1-1). Scientists, engineers, technical and administrative personnel are employed at WRF in support of a variety of programs involving nuclear weapons effects and Army systems survivability.

WRF contains a Wildlife Sanctuary/Open Space area along its riverfront, three electromagnetic effects testing areas, a research/development test area, a central compound for research/development and administration, a recreation area at the northeast corner of the facility, and an open buffer space along the northern boundary of the installation (see Figure 1-2).

Areas at WRF that may be of environmental concern include landfills, spill and drainage areas, underground storage tank (UST) areas and areas where potential toxic or hazardous materials (including polychlorinated biphenyls (PCBs) buried copper and lead wire antennas, and a buried intruder detection system composed of ethylene glycol-filled plastic pipes) were used or stored.

1.3 HISTORY

The WRF site has been in continuous use since the late 17th century, when it was acquired as part of a large landholding in this part of Virginia. Until the 1950s, when the Army acquired the land, the area was used primarily for agriculture and grazing, and was the location for several fisheries.

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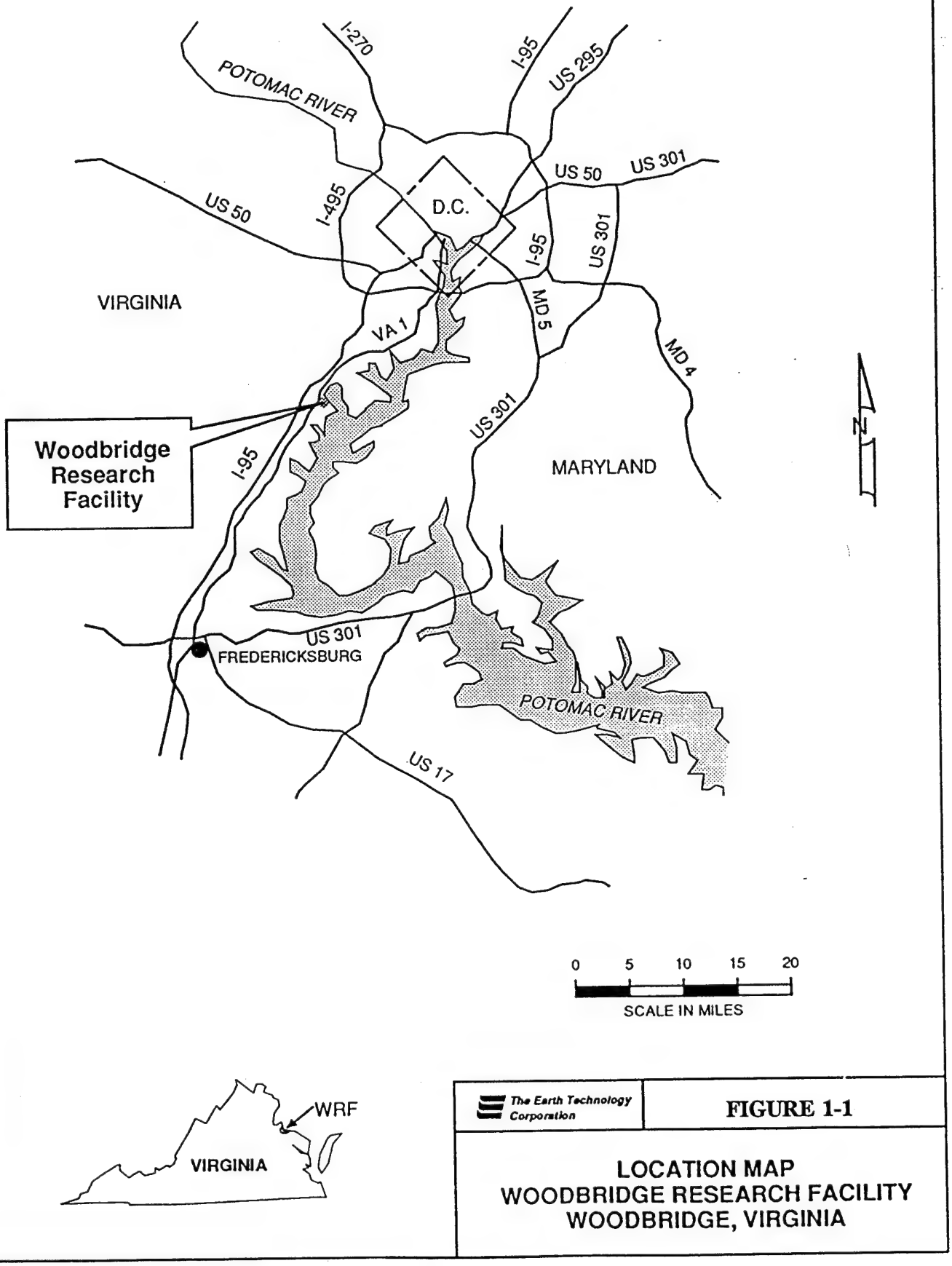
POTOMAC RIVER
I-270
I-95
US 295
US 50
US 301
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D.C.
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VA 1
MD 4
Woodbridge Research Facility
I-95
US 301
MARYLAND
N
US 301
FREDERICKSBURG
POTOMAC RIVER
US 17
0 5 10 15 20
SCALE IN MILES
WRF
VIRGINIA
The Earth Technology Corporation
FIGURE 1-1
LOCATION MAP
WOODBRIDGE RESEARCH FACILITY
WOODBRIDGE, VIRGINIA

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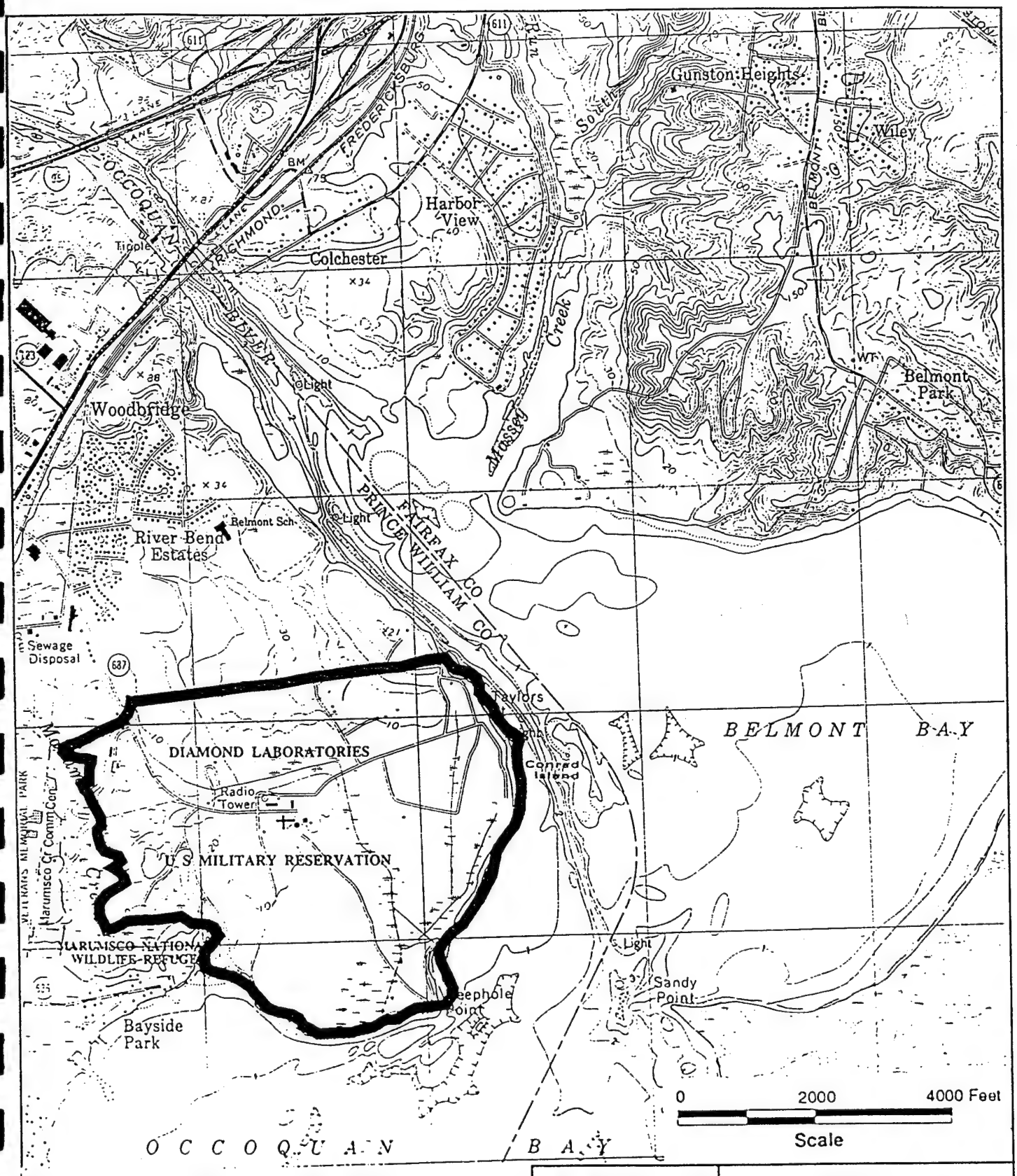

SOURCE: USGS Fort Belvoir 7.5' Quadrangle, Virginia (1965, photorevised 1983)

North

VIRGINIA

QUADRANGLE LOCATION

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FIGURE 1-2

WOODBRIDGE RESEARCH FACILITY LOCATION MAP

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In 1951, the Army acquired the WRF land for use as a military radio station. WRF was later assigned to the U.S. Army Command and Administrative Communications Agency, which designated the site as the Army Transmitting Station (ATS). This facility continued to serve as a communications center until July 1969, when it was deactivated and became inactive.

In July 1970, the property was transferred to the U.S. Army Materiel Command, and later to the U.S. Army Mobility Equipment Research and Development Center, which redesignated it as WRF. This site was chosen for experiments involving nuclear weapons effects research and testing.

The current WRF mission is to conduct electromagnetic pulse (EMP) research and testing, specifically the EMP effects of exo-atmospheric nuclear weapons detonation on communications and other military systems.

1.4 POLICY STATEMENT

It is the policy of The Earth Technology Corporation (Earth Technology) to provide a safe and healthful work environment for all its employees. Earth Technology considers no phase of operations or administration to be of greater importance than injury and illness prevention. Safety takes precedence over expediency or shortcuts. At Earth Technology, we believe every accident and every injury is avoidable. Every reasonable step will be taken to reduce the possibility of injury, illness, or accident.

This Health and Safety Plan prescribes the procedures that must be followed by all site personnel while working on the site. Operational changes which could affect the health or safety of personnel, the community, or the environment will not be made without prior approval of the client, the Earth Technology Project Manager, and the Earth Technology Health and Safety Department.

The provisions of this plan are mandatory to all Earth Technology personnel and subcontractors assigned to the project. Earth Technology requires all visitors to any of the work sites to abide by these procedures. Work conditions can change as operations progress. The Corporate Health and Safety Officer will provide written addenda to this Health and Safety Plan when changes warrant. No changes to the plans will be implemented without prior approval and notification of the Corporate Health and Safety Officer or his authorized representative. In addition, any changes or modifications to this Health and Safety Plan will be approved by the U.S. Army Environmental Center's (USAEC's) Safety and Environmental Services (SES) Branch. The Health and Safety Plan will be approved by USAEC prior to the start of the field work. A copy of this Health and Safety Plan will be available at each work location.

1.5 REFERENCES

This Health and Safety Plan complies with applicable U.S. Department of Labor Occupational Safety and Health Administration (OSHA), United States Environmental Protection Agency (EPA), and United States Army regulations. This plan follows the guidelines established by the regulatory agencies in the following documents.

(a) *Standard Operating Safety Guides*, U.S. EPA, November 1984.

(b) *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, NIOSH 85-115, 1985.

(c) Title 29 of the Code of Federal Regulations, Part 1910 (29 CFR 1910), Occupational Safety and Health Standards (OSHA), with special attention to Section 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER).

(d) Title 29 of the Code of Federal Regulations, Part 1926 (29 CFR 1926), Safety and Health Regulations for Construction (OSHA).

(e) National Oil and Hazardous Substances Contingency Plan.

2.0 RESPONSIBILITIES

Earth Technology will conduct a SI/RI at WRF. This work will entail field investigations involving Earth Technology and/or subcontractor personnel. All monitoring will be conducted under the direction of a Certified Industrial Hygienist. Figure 2-1 shows the Earth Technology lines of authority and communication.

2.1 ALL PERSONNEL

Each person is responsible for his/her own health and safety, for completing tasks in a safe manner, and for reporting any unsafe acts or conditions to his/her supervisor and/or the Site Supervisor. All personnel are responsible for continuous adherence to these health and safety procedures during the performance of their work. No person may work in a manner that conflicts with the letter of intent of safety and environmental precautions expressed in these procedures. After due warnings, Earth Technology will dismiss from the site any person who violates safety procedures. Earth Technology employees are subject to progressive discipline and may be terminated for blatant or continued violations. All onsite personnel will be trained in accordance with 29 CFR 1910.120 and this document.

2.2 PROGRAM MANAGER

The Program Manager is ultimately responsible to the Principal-in-Charge of Earth Technology for ensuring that all project activities are completed in accordance with requirements set forth in this plan. The Program Manager will confer with the designated Corporate Health and Safety Officer on all matters affecting health and safety. Other responsibilities include:

1. Reading and becoming familiar with this plan.

2. Requiring a prompt and thorough investigation of all accidents.

3. Scheduling an Accident Review Board within 10 days of an injury involving a workers' compensation claim or OSHA-recordability, or any accident with more than a $500 loss.

2.3 PROJECT MANAGER

The Project Manager is responsible for coordinating with the client (including the USAEC SES Branch), discipline managers, and subcontractors to complete all project activities to the satisfaction of the client and in accordance with requirements set forth in this plan. The Project Manager will confer with the Corporate Health and Safety Officer on all matters affecting health and safety. Other responsibilities include:

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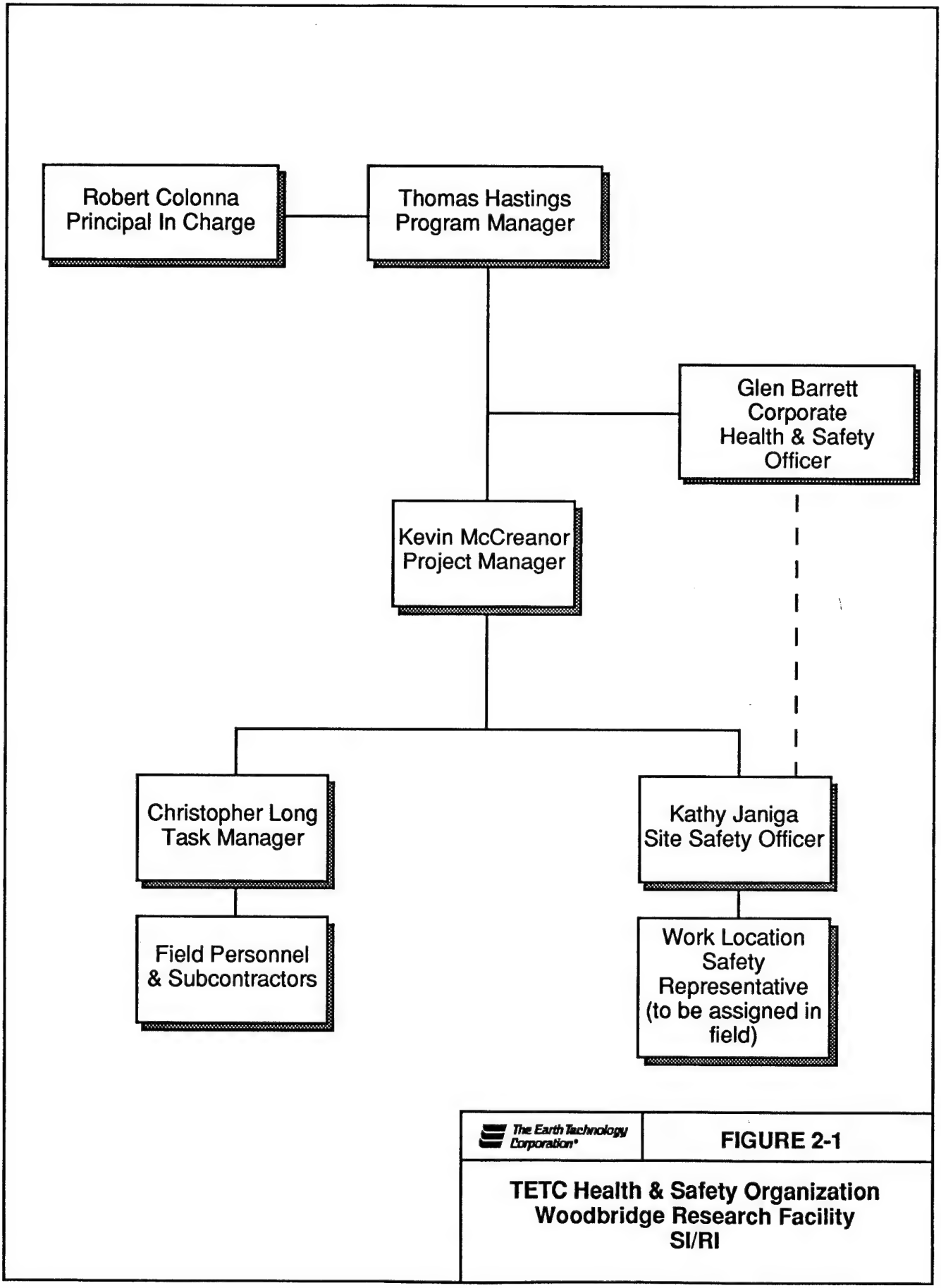

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FIGURE 2-1

TETC Health & Safety Organization
Woodbridge Research Facility
SI/RI

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1. Reading and becoming familiar with this plan.

2. Conducting periodic reviews of the project site and safety documentation.

3. Maintaining compliance with the Health and Safety Plan and other safety regulations.

4. Approving in writing each addendum to the Health and Safety Plan.

5. Ensuring that site personnel assigned have received the proper training and medical clearance prior to entering the site.

6. Maintaining the presence of qualified first-aid providers on site.

7. Discussing potential health and safety hazards with the Corporate Health and Safety Officer and the Program Manager.

8. Implementing changes as directed by the Program Manager and approved Health and Safety Plan addenda.

2.4 TASK MANAGER

The Task Manager supervises all Earth Technology activities at the site and is responsible for field implementation of the Health and Safety Plan. This includes communicating site requirements to all personnel, observing that field supervisors and subcontractors enforce all provisions of the Plan, working with the Site Safety Officer to implement all elements of this Health and Safety Plan, and consulting with the Corporate Health and Safety Officer regarding changes to the Health and Safety Plan. Other responsibilities include:

1. Reading and becoming familiar with this plan.

2. Enforcing the Health and Safety Plan and other safety regulations.

3. Stopping work, as required, to maintain personal and environmental health and safety.

4. Determining evacuation routes, establishing and posting local emergency telephone numbers, and arranging emergency transportation.

5. Ensuring that all site personnel and visitors have received the proper training and medical clearance prior to entering the site.

6. Establishing Exclusion, Contamination Reduction and Support zones.

7. Presenting tailgate safety meetings and maintaining attendance logs and records.

8. Implementing the respiratory protection program.

9. Maintaining decontamination procedures which meet established criteria.

10. Discussing potential health and safety hazards with the Corporate Health and Safety Officer and the Project Manager.

11. Implementing changes as directed by the Project Manager and approved Health and Safety Plan addenda.

2.5 CORPORATE HEALTH AND SAFETY OFFICER

The Corporate Health and Safety Officer is responsible for developing and coordinating the site-specific Health and Safety Plan and addenda, as required. The Corporate Health and Safety Officer will issue addenda to the Health and Safety Plan when warranted by changed conditions. The Corporate Health and Safety Officer reports to the Project Manager for operational matters. The Corporate Health and Safety Officer is the contact for regulatory agencies on matters of safety and health. Other responsibilities of the Corporate Health and Safety Officer include:

1. General health and safety program administration.

2. Conducting project health and safety audits.

3. Developing site-specific employee/community emergency response plans, as required, based on expected hazards.

4. Determining the level of personal protection required.

5. Updating equipment or procedures based on information obtained during site operations.

6. Establishing air monitoring parameters based on expected contaminants.

7. Implementing employee exposure assessment notification.

2.6 SITE SAFETY OFFICER

The Project Manager will designate the Site Safety Officer (SSO). The SSO is responsible for performing the routine duties for health and safety, with the assistance of the Corporate Health and Safety Officer. The SSO will administer the site-specific Health and Safety Plan and addenda. These responsibilities include:

1. Performing regular and frequent site inspections to find hazards and observe employees at work.

2. Stopping work when necessary to prevent injury or illness and ensure personal and environmental health and safety.

3. Investigating all injuries and illnesses.

4. Developing and implementing corrective action plans to eliminate or mitigate hazards.

5. Implementing air monitoring according to directives in this Health and Safety Plan.

6. Forwarding all employee exposure monitoring information to the Corporate Health and Safety Officer to enable employee exposure notification.

2.7 WORK LOCATION SAFETY REPRESENTATIVE

The SSO will appoint a safety representative at each work location. The safety representative, an Earth Technology employee, will assist the SSO at his/her work location and will be responsible for:

1. Enforcing entry and exit procedures to the work area.

2. Maintaining a record of personnel activities, monitoring activities and results, chemical exposure symptoms/incidents, and personal protective equipment (PPE) usage.

3. Enforcing all applicable Health and Safety Plan requirements.

4. Observing that all work location personnel and visitors have received required training and medical monitoring, and assuring that they adhere to the provisions of this Plan.

5. Contacting the SSO for assistance or guidance as warranted based upon Health and Safety Plan requirements or work location conditions.

In most instances, the work location safety representative will not be dedicated to performance of health and safety functions only, but will have additional duties and functions which may include supervision of work activities or technical support. Any individual appointed as a work location safety representative must meet the supervisor's safety training requirements as specified in 29 CFR 1910.120 (e)(4). A safety representative will be present at each work location whenever any work activities governed by this Health and Safety Plan are in progress.

2.8 SUBCONTRACTORS

Onsite subcontractors and their personnel are responsible for reading, understanding, and complying with all site requirements. Subcontractors are required to follow the guidelines

established in this Health and Safety Plan, OSHA HAZWOPER regulations, and Construction Safety Orders. Each subcontractor will designate a safety coordinator, with the authority and responsibility to implement health and safety requirements for the subcontractor's employees. The safety coordinator will also serve as the subcontractor's point of contact with the SSO concerning safety issues.

2.9 Onsite Personnel and Visitors

All personnel working for The Earth Technology Corporation and its subcontractors are required to read and acknowledge their understanding of this Health and Safety Plan. All visitors to contaminated areas of this project must also read and acknowledge their understanding of this Health and Safety Plan. All personnel are expected to abide by the requirements of this Health and Safety Plan and cooperate with site supervision to ensure a safe and healthful work site. Site personnel are required to report immediately any of the following to the Work Location Safety Representative:

1. Accidents and injuries, no matter how minor.
2. Unexpected or uncontrolled releases of any hazardous substances.
3. Any symptoms of exposure to a hazardous substance.
4. Any unsafe or malfunctioning equipment.
5. Any changes in site conditions which may affect the health or safety of project personnel.

3.0 SCOPE OF WORK

3.1 SCOPE

Earth Technology will conduct an SI/RI, to provide preliminary and follow-up evaluation of the existence of environmental contamination at 22 AREEs located at WRF. The Work Plan details all activities that will be undertaken at WRF. All AREEs have been previously identified based upon their potential for significant environmental contamination (Weston, 1992).

3.2 SITE ACTIVITIES

At each AREE, investigation will be conducted as appropriate to initially determine the possible existence and extent of environmental contamination. Tasks will include:

1. Geophysical surveys.
2. Installation of soil boreholes.
3. Installation of groundwater monitoring wells.
4. Sampling from surface water.
5. Sampling from surface soil and subsurface soil.
6. Groundwater sampling using both existing and new monitoring wells.
7. Sediment and sludge sampling.
8. Excavations to investigate subsurface anomalies.
9. Direct push method to collect groundwater samples.
10. SCAPs to identify organic contamination.

Table 3-1 provides a summary of the potential chemicals of concern and work tasks to be performed at each AREE.

TABLE 3-1
AREEs IDENTIFIED AT WOODBRIDGE AND PROPOSED ACTIVITIES

AREE[1] No.	Description[1]	Summary of Findings[1]	Possible Chemicals of Concern[2]	Proposed Activity
1	Landfill No. 1	Landfill contains metal, wire, concrete, wood, rubber tires, possible electrical capacitors. Covered with soil. Operated 1950s - 1973.	Metals, PCBs, petroleum products, asbestos	Groundwater sampling, soil sampling, surface soil sampling, geophysics, excavation, direct push sampling, boreholes, well installation, land surveying
2	Landfill No. 2	Landfill contained metal debris, wire, wood, miscellaneous refuse, capacitors and transformers containing PCBs. Capped with soil in 1973. Excavated in 1984. Contaminated material taken to H.M. Landfill.	PCBs, metals, petroleum products	Groundwater sampling, surface water sampling, sediment sampling, direct push sampling, boreholes, well installation, land surveying
3	Landfill No. 3	Landfill contains lead-containing wire, paper, plastic, wood. Covered with soil in 1973.	Metals, PCBs, petroleum products	Groundwater sampling, surface water sampling, sediment sampling, soil sampling, geophysics, excavation, direct push sampling, boreholes, well installation, land surveying
4	Landfill No. 4	Landfill contains wire, trash, empty oil drums. Covered with soil in 1973. Operated 1950s - 1973.	Metals, PCBs, petroleum products	Groundwater sampling, surface water sampling, sediment sampling, soil sampling, geophysics, excavation, direct push sampling, boreholes, well installation, land surveying
5	Landfill No. 5	Landfill contains metal debris. Was covered before 1970.	Metals, PCBs, petroleum products	Groundwater sampling, surface water sampling, sediment sampling, soil sampling, geophysics, excavation, direct push sampling, boreholes, well installation, land surveying

TABLE 3-1
AREEs IDENTIFIED AT WOODBRIDGE AND PROPOSED ACTIVITIES

Continued

AREE[1] No.	Description[1]	Summary of Findings[1]	Possible Chemicals of Concern[2]	Proposed Activity
6-A	Potential Landfill	Aerial photos indicate disturbance in 1960s and 1970s.	Metals, PCBs, petroleum products	Groundwater sampling, surface water sampling, sediment sampling, excavation, soil sampling, geophysics, direct push sampling, boreholes, well installation, land surveying
6-B	Potential Landfill	Aerial photos indicate soil disturbance in 1960s and 1970s.	Metals, PCBs, petroleum products	Groundwater sampling, excavation, soil sampling, geophysics, direct push sampling, boreholes, well installation, land surveying
7	Pistol Range	Rounds fired into soil bank. Covered with soil in 1982.	Lead	Soil sampling, excavation, boreholes, land surveying
8	UST Leaks and Spills	Area contained three 10,000-gallon USTs which were removed after leaking. Several major oil spills during UST filling and oil transfers. Water and oil seeps into pit in nearby maintenance shop after rain.	Petroleum products	Groundwater sampling, surface water sampling, sediment sampling, surface soil sampling, soil sampling, geophysics, excavation, direct push sampling, SCAPs, boreholes, well installation, land surveying
11	Oil/Water Separator	Waste oils from motor pool emptied into drains which ran to oil/water separator. Water discharged to grounds. Also vehicle Wash Rack to oil/water separator; Wash Rack drain plugged in 1990.	Petroleum products, VOCs, BNAs, PCBs	Groundwater sampling, surface water sampling, sediment sampling, soil sampling, geophysics, excavation, direct push sampling, boreholes, well installation, land surveying
12	Drum Storage Area	Waste drums stored on pavement north of maintenance shop contain waste oil, paints, cleaning solvents, antifreeze, and brake fluid and are sent to Adelphi periodically.	Petroleum products, VOCs, BNAs	Groundwater sampling, soil sampling, geophysics, excavation, direct push sampling, boreholes, well installation, land surveying

TABLE 3-1
AREEs IDENTIFIED AT WOODBRIDGE AND PROPOSED ACTIVITIES

Continued

AREE[1] No.	Description[1]	Summary of Findings[1]	Possible Chemicals of Concern[2]	Proposed Activity
13	Acid Neutralization Tank	UST connected to drain in battery storage room in Building 211	Acid, metals	Soil sampling, geophysics, excavation, direct push sampling, boreholes, land surveying
14	Oil/Water Separator (Building 211)	UST connected to drain in work area in Building 211. Water drains to field east of building.	Petroleum products, VOCs, BNAs	Groundwater sampling, surface water sampling, sediment sampling, soil sampling, geophysics, excavation, direct push sampling, boreholes, well installation, land surveying
18	Flammable/Battery Storage (Building 204)	Storage building for batteries and drums containing flammable materials such as waste oil. Has concrete floor. Current battery storage area has safety shower and drain.	Metals, VOCs, BNAs	Groundwater sampling, surface soil sampling, soil sampling, geophysics, excavation, direct push sampling, boreholes, well installation, land surveying
19	Thermal Battery Storage	Metal container has thermal batteries.	Metals, asbestos	Groundwater sampling, surface soil sampling, soil sampling, excavation, direct push sampling, boreholes, well installation, land surveying
20	Former Incinerator	Metal box was used to burn paper from the 1950s to mid 1970s.	Metals	Surface soil sampling, geophysics, excavation, boreholes, land surveying
21	Former Storage Area	Site partially covered by present Building 211. Reportedly stored transformers and capacitors in early 1970s.	PCBs, Petroleum Products	Groundwater sampling, surface soil sampling, soil sampling, excavation, direct push sampling, boreholes, well installation, land surveying

TABLE 3-1
AREEs IDENTIFIED AT WOODBRIDGE AND PROPOSED ACTIVITIES

Continued

AREE[1] No.	Description[1]	Summary of Findings[1]	Possible Chemicals of Concern[2]	Proposed Activity
22	Drainage Ditch	Oil spills may have drained to ditch. Contamination may have entered ditch from off-site.	Petroleum products	Groundwater sampling, surface water sampling, sediment sampling, soil sampling, excavation, direct push sampling, SCAPs, boreholes, well installation, land surveying
23	Existing and Former Underground Storage Tanks	Six existing USTs, two of which have been leak tested. Six USTs have been removed, four as the result of failing leak tests conducted in 1990 and 1991, and two removed earlier after they were determined to be leaking.	Petroleum products	Groundwater sampling, surface water sampling, sediment sampling, surface soil sampling, soil sampling, geophysics, excavation, direct push sampling, SCAPs, boreholes, well installation, land surveying
25	Sewage Injection Area	Sewage sludge injected into ground at depth of 2 feet in 1974.	Metals	Surface soil sampling, soil sampling, excavation, direct push sampling, boreholes, land surveying
26	Buried Antifreeze in Hoses	Ethylene glycol in rubber pipes in ground.	Ethylene glycol	Soil sampling, geophysics, excavation, direct push sampling, boreholes, land surveying
27	Buried Wire	Metal and plastic wire buried in ground for tests, could contain PCBs.	Lead, PCBs	Surface soil sampling, soil sampling, geophysics, excavation, direct push sampling, boreholes, land surveying

[1] Roy F. Weston, Incorporated, June 1992. Enhanced Preliminary Assessment (PA), Woodbridge Research Facility.
[2] Possible Chemicals of Concern as identified in PA may or may not be present at the AREE.

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4.0 HEALTH AND SAFETY PROGRAMS

4.1 MEDICAL SCREENING AND HEALTH SURVEILLANCE

All personnel performing SI/RI activities at any AREE shall conform with the medical monitoring requirements specified below.

4.1.1 Annual Physical Examinations

All onsite personnel shall have completed a physical exam in accordance with the requirements of 29 CFR 1910.120 (f). This shall include:

1. Medical and occupational history.
2. Physical examination.
3. Complete blood count and differential.
4. Urinalysis (dipstick and microscopic).
5. Blood chemistry for liver function.
6. Audiometric examination.
7. Chest X-ray (14 x 17 posterior/anterior views; chest X-ray performed on biannual basis or as needed).
8. Pulmonary function test (FVC and $FEV_{1.0}$).
9. EKG (for employees over 45 or when there is indication of problems).
10. Visual acuity and color.

4.1.2 Medical Evaluation

The results of medical examinations are to be evaluated by a physician specializing in occupational medicine. The medical evaluation includes a judgment of the employee's ability to use respiratory protective equipment and to participate in contaminated waste site activities. Restrictions of onsite activities may be required for personnel with certain medical conditions which could be aggravated by chemical exposure or physical demands at the site. The physician is responsible for notifying the Corporate Health and Safety Officer of physical or medical restrictions. The Corporate Health and Safety Officer will then ensure that project management observes and enforces the restrictions.

4.1.3 Medical Assistance

Telephone numbers and locations for local fire department, hospitals, ambulance service, and other emergency services shall be posted and maintained at the site by the SSO. A first-aid kit shall be available at each work area for use by trained personnel.

Information regarding nonemergency medical treatment for onsite injury, onsite illness, or onsite exposure to chemical contaminants will be provided to the hospital by the Work Location Safety Representative.

4.2 NOTIFICATION AND RECORDKEEPING

Prior to starting field activities, the Project Manager will notify the Safety Office and Environmental Office at the installation and local fire and medical personnel of the planned activities. In addition, the local fire department will be furnished with a list of all chemicals (including quantities and storage locations) brought on the installation (i.e., preservatives, calibration gases, fuel, etc.). Any injury or illness will be immediately reported to the SSO. The SSO will report these incidents to the Task Manager. Upon learning of an injury or illness, the Task Manager shall immediately perform all required notifications, including the following individuals:

1. Project Manager.
2. Corporate Health and Safety Officer.

OSHA requires notification within 24 hours, and preferably during the same work shift, in the event of a fatality or severe injury requiring hospitalization. The Corporate Health and Safety Officer will make such notifications to OSHA, and therefore must receive the information in time to make the notification without penalty.

Accidents resulting in any fatality, lost-time injury or illness, hospitalization of 3 or more personnel, or property damage to government or contractor property (which occurred during the performance of the contract) equal to or exceeding $2,000.0 must be telephonically reported to USAEC, SFIM-AEC-TSS (410) 671-4811, as soon as possible, but not later than 2 hours after occurrence and reported in writing within 5 days of occurrence on DA Form 285 included in Appendix D. All other accidents/incidents must be telephonically reported to USAEC, SFIM-AEC-TSS (410) 671-4811, within 8 hours of occurrence.

The SSO shall record in the following in the daily health and safety log:

- Who is on site,
- The activities being performed,
- Identification of air monitoring equipment and results,
- Unusual occurrences or accidents, and
- The PPE used by each person on site.

Copies of this log shall be provided to USAEC on a weekly basis. All personnel working at WRF on the SI/RI will provide copies of training and medical monitoring documentation to the SSO prior to working at the facility. These documents will be kept at the field office.

4.3 General Health and Safety Planning

All project field personnel will have completed the necessary formal health and safety training courses prior to working on site. To comply with the provisions established in 29 CFR 1910.120 (e)(2) and (e)(3) (40-hour initial training), the basic training topics will include, but are not limited to:

1. Hazard communication.
2. Flammable atmospheres and ignition controls.
3. Toxic chemical recognition.
4. Exposure guidelines.
5. Protective clothing.
6. Respiratory protection.
7. Hearing conservation.
8. Heat stress.
9. Decontamination.
10. Prevention of slip, trip, and fall hazards.
11. Safe lifting techniques and safe work practices.

Work supervisors will receive an additional required 8 hours of training which addresses supervisor responsibilities and obligations in maintaining an effective health and safety program. All personnel will receive annual refresher training in accordance with 29 CFR 1910.120 (e)(8).

4.4 Site-Specific Training

All project personnel shall receive training concerning potential hazards at the site, and prevention or control measures. At least two people at each site will be trained in first aid and CPR. Field personnel will be:

1. Instructed on the contents of applicable portions of this plan.
2. Made aware of task-specific physical hazards and other hazards which may be encountered during site work.
3. Informed about the potential routes of exposure, protective clothing, precautionary measures, and symptoms or signs of chemical exposure, and heat stress.
4. Made aware of fire prevention measures, fire extinguisher locations, fire extinguishment methods, and evacuation procedures.

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5.0 HAZARD ASSESSMENT

5.1 JOB HAZARD ANALYSIS

The Job Hazard Analysis identifies potential safety, health, and environmental hazards and provides for the protection of personnel, the community, and the environment. Because of the complexity and constant change of site investigation projects, supervisors must continually inspect the work sites to identify hazards which may harm site personnel, the community, or the environment. The Task Manager must be aware of these changing conditions and discuss them with the SSO. The Task Manager will discuss these changing conditions with the Corporate Health and Safety Officer and the Project Manager whenever these changes impact the health, safety, or performance of the project. The Task Manager will keep subcontractor supervisors informed of the changing conditions. The Corporate Health and Safety Officer will write addenda to change the Job Hazard Analysis and associated hazard controls as necessary.

5.2 POTENTIAL HAZARDS

Potential hazards relevant to the project are summarized below.

1. Risk of exposure to known and unknown materials, such as PCBs, petroleum hydrocarbons, solvents, degradation products, metals, sewage wastes, and other chemicals which may have been used or disposed on WRF.

2. Cleaning and decontamination of equipment.

3. Heavy equipment operation, such as drill rigs.

4. Hazard to hearing from noisy equipment, such as portable generators and drill rigs.

5. Risk of heat stress from the effects of weather and personal protective equipment requirements.

6. Electrical and high-pressure release hazards involving underground and overhead electric, gas, or other utilities.

7. Hazardous flora and fauna (especially snakes) (see Appendix E).

5.3 HAZARDOUS AND TOXIC MATERIALS OF CONCERN

The Earth Technology Corporation's exposure guidelines (see Appendix C) are based on the best available information from National Institute of Occupational Safety and Health (NIOSH), OSHA, and the American Conference of Governmental Industrial Hygienists (ACGIH). These

exposure guidelines will be used on this project. The Corporate Health and Safety Officer will update this section as information developed during this project warrants. For detailed information regarding these materials, contact the Corporate Health and Safety Officer at (703) 549-8728.

1. ***Metals.*** Metals of significance which are suspected to be present include chromium, copper, lead, nickel, and zinc. These metals may present a hazardous exposure in the form of airborne dust. As long as dust control practices (e.g., wetting, spraying, foam suppression) are maintained, the metal contaminants (and semivolatile contaminants, see below) should not present a health hazard. Based upon models which predict the airborne particulate contaminants which could be encountered at greater than expected soil concentrations of metal dust, levels will not exceed the OSHA permissible exposure limits as long as the maximum dust cloud does not exceed 10 milligrams per cubic meter (mg/m^3) of total dust. The airborne particulate concentration should never approach this level, if dust control practices are used during tasks receiving soil disturbances.

2. ***Volatile organics.*** Various petroleum products, including gasoline, diesel fuel, fuel oils, and motor oils (including used oils) may be present. The aromatic additives often found in some of these products (benzene, toluene, ethylbenzene, and xylenes (BTEX)) may also be present, as could other solvents (methyl ethyl ketone (MEK), carbon tetrachloride, trichloroethylene, etc.) suspected to have been used at WRF. In most locations, the volatiles in surface soils have weathered to the point where they are not capable of generating hazardous airborne concentrations. Volatiles protected from weathering, such as in deep soils, may present an inhalation hazard when they are uncovered. All personnel, including drillers, should stay upwind of the borehole when drilling through contaminated soil and wear proper PPE as directed in Appendix A.

3. ***Semivolatile compounds.*** Various base-neutral and acid extractable compounds have been noted at WRF, as have PCBs. These are not expected to present a significant inhalation hazard (see above); however personnel should implement measures to protect against skin contact.

4. ***Asbestos.*** Asbestos-containing material may have been buried in Landfill No. 1. Asbestos poses an inhalation hazard within its exposed, broken, or crumbling. Inhalation of friable asbestos can cause cancer. Any suspected asbestos-containing material should be handled by a person wearing Level C protection. If during any intrusive act suspected friable asbestos material becomes visible, then the operation will stop, personnel will upgrade to Level C, and air monitoring will be performed according to OSHA 29 CFR 1910.1001.

5.4 FIELD ACTIVITY HAZARDS AND GUIDELINES

5.4.1 Reconnaissance Activities

During site reconnaissance, sample locations will be identified at each AREE. Surface sample and borehole locations will be marked with stakes. Because ground and walking surfaces vary at each site, proper footwear must be worn. Leather work boots (6- to 9-inch) with safety toes are recommended. The major hazards include: heat stress and sunburn; snakes, insects, and unprepared walking surfaces. Workers involved in reconnaissance activities should take the following precautions:

1. Watch carefully where you walk. Do not step in shadows until you are sure of your footing. Snakes often lay in shadows to avoid the heat of the sun, and shadows may hide pits, holes, or other unstable footing.

2. Carefully choose your footholds when crossing rocky, uneven, or loose soils.

3. Stay within site of your buddy.

5.4.2 Surface Soil Collecting

Surface soil samples will be collected using trowels. Potentially contaminated soils present the risk of contact with hazardous substances. See Appendix A for a summary of specific chemical and physical hazards associated with each AREE and recommended PPE. Appendix B summarizes the hazards of each chemical, and Appendix C provides exposure guidelines. Review the safety precautions in Section 5.4.1 above.

5.4.3 Borehole and Monitoring Well Installation

The primary physical hazards for borehole and monitoring well installation are associated with the use of the drilling rig and supporting vehicles. Physical hazards specific to drilling are listed below.

1. **Slips.** Slips are toothed wedges positioned between the drill pipe and the master bushing/rotary table, to suspend the drill string in the well bore when it is not supported by the hoist. Most accidents associated with slip operations are related to manual materials handling; strained backs and shoulders are common.

2. **Tongs.** Tongs are large, counter-weighted wrenches used to break out the torqued couplings on drill pipe. Both sets of tongs have safety lines; when breakout force is put on the tongs, the tongs or the safety lines could break and injure an employee standing close to them. Another likely accident can occur when the driller actuates the wrong tong lever and an unsecured tong swings across the rig floor at uncontrolled velocity. A common accident attributable to tongs can occur when an employee has his/her hand or finger in the wrong place

as he/she attempts to swing and latch the tong onto the drill pipe, resulting in crushing injuries or amputation of the fingers.

3. **Elevators.** Elevators are a set of clamps affixed to the bails on the swivel below the traveling block. They are used to clamp each side of a drill pipe and hold the pipe as it is pulled from the well bore. Accidents and injuries can occur during the latching and unlatching tasks; fingers and hands can get caught and crushed in the elevator latch mechanism. If the latching mechanism fails when the pipe is overhead, the pipe may fall on employees working on the drill floor.

4. **Cat Lines.** Cat lines are used on drilling rigs to hoist material. Accidents that occur during cat line operations may injure the employee doing the rigging as well as injure the operator. Minimal hoisting control causes sudden and erratic load movements which may result in hand and foot injuries.

5. **Working Surfaces.** The rig floor is the working surface for most tasks performed in well drilling operations. The surface is frequently wet from circulating fluid and/or water used to wash it down. Slippery work surfaces can increase the likelihood of back injuries, overexertion injuries, and slips and falls.

6. **Derrick Operations.** The derrick person on a well drilling operation performs his/her tasks from various elevated work platforms in the mast. He/She is exposed to falls when not using fall protection equipment while climbing the derrick ladder, while working with the pipe stands, and while moving from the ladder to his/her platform station.

7. **Materials Handling.** The most common type of accident that occurs in material handling operations is the "caught between" situation when a load is being handled and a finger or toe gets caught between two objects. Rolling stock can shift and/or fall from a pipe rack or truck bed.

In addition to the specific hazards listed above, rig accidents can occur as a result of improperly placing the rig on uneven or unstable terrain, or failing to adequately secure the rig prior to the start of operations. Specific drill rig operation and safety requirements are presented in Appendix F.

5.4.4 Excavation Construction Guidelines

Excavation and trenching may present substantial risk of injury. The following safety guidelines conform with the requirements of 29 CFR 1926.650 and are mandatory for all trenching and excavating activities.

1. Prior to excavation, the location of all underground installations such as sewer, water, fuel, electric lines, telecommunication lines, tanks, etc., shall be marked.

2. Trees, boulders, poles, structures, and other surface encumbrances that create a hazard or are endangered by the excavation shall be relocated or made safe before opening the excavation.

3. The SSO or designee shall examine the area of the excavation to determine that no recognizable conditions exist which would expose employees to injury from possible moving ground before work is permitted in or adjacent to the excavation.

4. Excavations shall be inspected by the SSO or designee after every rainstorm or other hazard-increasing occurrence and the protection against slides and cave-ins shall be increased, if necessary, before excavation activities resume.

5. Excavated material shall be prevented from falling back into the area where employees are working. This shall be done by locating the spoil at a distance from the edge of the excavation consistent with the character of the materials and the nature of the operations; unless otherwise contained, in no case shall the excavated material be placed closer than 5 feet from the edge of excavations 5 feet or more in depth. For lesser depths, a 1-foot clearance shall be maintained.

6. No method that disturbs the soil that is in place (such as driving stakes) shall be used to contain the spoil material.

7. Trenches shall only be crossed where safe crossings have been provided.

8. If it becomes necessary to provide walkways or bridges across excavated areas, they shall be provided with standard guardrails and toeboards when the depth of excavation exceeds 7 feet.

9. An employee working in the vicinity of operating excavating equipment shall be required to work in a safe position such that the employee is not in danger of falling into or otherwise contacting the machine's moving parts.

10. No excavation work shall take place below the level of the base of an adjacent foundation, retaining wall, or other structure until it has been determined by the SSO or designee that such excavation will in no way create a hazard to workers or until adequate safety measures have been taken for the protection of workers.

11. Undermined sidewalks and pavements shall be supported to safely carry all anticipated loads.

12. If the stability of adjoining buildings or walls is endangered by excavations, either shoring, bracing, underpinning, or some other method affording equivalent protection for workers shall be provided, as necessary, to ensure their safety. Excavating close to an existing structure is not planned, however, if shoring or retaining walls are needed, shoring requirements will be provided as an addendum to this Health and Safety Plan. All shoring shall be inspected daily or more

often, as conditions warrant, by the SSO or designee and the protection shall be effectively maintained.

13. No existing wall or other structure shall be made by reason of an excavation or backfill to function as a retaining wall until it has been determined that such wall will safely withstand all expected loads that otherwise might be a source of hazard to workers.

14. When mobile equipment is used or allowed adjacent to excavations, stop logs or barricades will be installed. The grade will always be away from the excavation.

15. Diversion ditches, dikes, or other suitable means will be used to prevent water from entering an excavation and for drainage of the excavation.

16. Accumulations of water in excavations which endanger the stability of those excavations or pose a hazard to workers shall be controlled before further work proceeds.

17. Special safety provisions consisting of additional bracing or other effective means shall be taken at excavations adjacent to streets, railroads, or sources of external vibrations or superimposed loads. Similar provisions shall be taken in excavations made in areas that have been previously filled.

18. Dusty conditions during excavation will be kept to a minimum. The application of wetting agents shall be at the direction of the SSO.

5.4.5 Trench Entry Guidelines

Entering a trench or excavation presents many hazards. Trenches will not be entered; all samples will be collected from the bucket of the backhoe at a safe distance from the trench. To protect from being buried or inhaling a hazardous atmosphere, the following guidelines must be followed whenever entering an excavation or trench.

1. Work in an excavation shall at all times be under the immediate supervision of a competent person who is authorized to modify the shoring or sloping to protect their safety.

2. Any trench more than 4 feet in depth shall be provided with a safe means of access located no more than 25 feet of lateral travel from the work area. The access may be a ramp not less than 20 inches in width and sloped no steeper than 2 feet in 10 feet. If access is provided by a ladder, the ladder shall be secured at the top to prevent displacement.

3. The use of ladders in excavations shall comply with 29 CFR 1926, Subpart L.

4. Ladders with broken or missing rungs or steps, broken or split side rails, or other faulty or defective construction shall be immediately removed from service and removed from the job site.

5. The carrying of persons in or on buckets, forklifts, or any other machinery not designed for transportation of personnel, is prohibited.

6. Any trench more than 5 feet in depth shall be protected by a system of shoring, sloping of the ground, or benching, or other alternate means as provided by 29 CFR 1910.650. Protection for employees who work in excavations less than 5 feet in depth shall also be provided when the worker's head is below the edge of the excavation or when examination by the competent person indicates that hazardous ground movement may be expected.

7. The atmosphere in the excavation shall be tested before entry to ensure the oxygen concentration should not exceed 19.5 percent, the combustible gas concentration is less than 10 percent of the lower explosive limit (LEL), and the concentration of any other hazardous contaminant that is likely to be present is less than one-half the exposure guideline shown in Appendix C of this plan.

8. Where airborne contaminants are likely, monitoring the atmosphere in the trench shall continue according to the Monitoring Plan in Section 6 of this plan.

5.5 Confined Spaces

A confined space, also called a permit required space, is defined as any space or enclosure that is large enough to be bodily entered and has limited openings for entry or exit, and may have limited ventilation. Examples include storage tanks (underground and aboveground), sewers, manholes, tunnels, excavations, and trenches. Confined spaces are not planned to be entered, however, if it becomes necessary the following procedures shall be followed.

Hazards associated with entering and working in confined spaces include:

1. Fire.
2. Explosion.
3. Poisoning.
4. Asphyxiation.
5. Structural failure.

All tanks, silos, mine shafts, pits, excavations, and trenches are considered confined spaces in accordance with 29 CFR 1910.146 until the atmosphere has been tested and assurances made that the atmosphere is safe and will remain safe during the entry. If the atmosphere has significant contaminant concentrations or may develop significant contaminant concentrations during entry, the following requirements will be enforced.

1. Appropriate ventilation of the confined space to eliminate the hazardous atmosphere and ensure the atmosphere will remain safe during entry should be accomplished as preferable to making a confined space entry. If this can be accomplished, the space will no longer be considered a confined space, and is not subject to confined space entry procedures in accordance with 29 CFR 1910.146.

2. If entry to the workspace can be improved so that workers and rescuers can walk out of the space, then the space is no longer a confined space, and is not subject to confined space entry procedures in accordance with 29 CFR 1910.146.

3. If the atmosphere cannot be rendered safe and assurance given that it will remain safe during the entry, an approved confined space entry permit will be required (see Appendix D). This permit must be signed by the SSO or Project Manager. After completion of the activity, the permit will be filed in the field office.

4. The workspace will be inspected and the atmosphere tested before entering. All observations and measurements will be recorded on the confined space entry permit. At a minimum, the space will be tested for oxygen content, combustible gases, and hydrogen sulfide. The oxygen concentration must not exceed 19.5 percent, the combustible gas concentration must be less than 10 percent of the LEL (includes monitoring of the LEL of methane), and the hydrogen sulfide concentration must be less than the action limit of 5 parts per million (ppm).

5. The confined space entry team will consist of at least three members, to include at least a first and second standby who will remain outside the space. The first standby must remain at the access point and in communication with the workers in the confined space. The second standby may be assigned other tasks as long as he can be hailed by the first standby and provide immediate assistance to the first standby.

6. The first standby will continuously monitor conditions in the space and record his/her observations and measurements while a person is in the confined space.

7. Workers entering the space will use necessary and appropriate personal protective equipment for all identified hazards within the space. At a minimum this will include a hard hat, a fifteen minute emergency respirator, safety glasses, safety-toe leather or water- and chemical-resistant boots.

8. Rescue procedures will be written and briefed to the confined space entry team.

9. Rescue equipment adequate to accomplish the rescue of all workers in the confined space will be set up and made ready before entry is made. The rescue equipment must be checked and tested to assure its readiness.

10. Excavations over 4 feet deep must be appropriately shored or sloped and inspected to assure structural integrity.

11. All sources of energy and hazardous materials must be locked out, tagged out, and effectively isolated except where physically impossible or required by the nature of the work to be accomplished in the confined space. Any material may be considered hazardous in a confined space if, by its presence or movement, it may create a hazard to the workers. Electrical systems must be locked out and tagged out with the only key for each lock in the possession of the team member entering the confined space. Piping systems should be blinded or effectively isolated to ensure no material enters the space. When valves are locked out and tagged out, the only key for each lock must be in the possession of the team member making the entry. If more than one worker must enter the confined space, then each team member entering the space must put his locks on all switches and valves which are locked out. Energy and material sources which are locked out must be tested to ensure the effectiveness of the isolation.

12. Only properly trained members of the confined space entry team shall be allowed into the confined space. All team members shall be trained according to 29 CFR 1910.146. Workers will be briefed on the work procedures for activities in the confined space, the specific hazards in the confined space, the PPE to be used, the communication protocol, entry and exit procedures, and any other significant facts about the confined space before entry.

13. The first standby shall record the name and time of entry and exit of each worker entering the confined space. The name of each team member shall appear on the confined space entry permit.

14. The first standby shall maintain clear communication with all workers inside the confined space. In many situations this will require an electronic communication system.

15. If entry is made by ladder or through a top opening, each worker shall wear a lifebelt or harness which allows an unconscious worker to be lifted out in an upright position.

16. Each worker in the confined space will be attached to a lifeline. The lifeline must be at least 1/2 inch in diameter and have at least 2,000-pound tensile strength. Each lifeline must be secured outside the confined space such that it remains accessible to the standby person at all times.

17. Every team member has the responsibility and authority to terminate the operation if danger is apparent.

18. Confined space rescues shall be performed in Level B protection, at a minimum.

19. Emergency assistance teams shall be notified immediately to assist with rescue.

20. Each day, all confined space entry permits will be filed in the permanent project documentation file.

5.6 HEAT STRESS

The use of protective equipment greatly increases the potential for workers to suffer some form of distress due to body overheating. The use of PPE substantially reduces the capacity for evaporative cooling, the body's primary method for heat loss, to regulate body temperature. The result can be heat stress. This can lead to increased irritability, weakness, mental confusion and poor judgement, and decreased work performance. In extreme cases, heat stroke, a life-threatening condition, may ensue and can lead to unconsciousness and even death. Frequent rest breaks, during which complete removal of protective clothing is accomplished, should be used to allow workers to cool off. Such breaks must occur in uncontaminated areas and entail complete decontamination to accomplish PPE removal. During these breaks, personnel should not be assigned other tasks to perform. Workers should be encouraged to drink large quantities of cool liquids to replace lost fluids and aid in keeping body core temperature down.

5.7 HAZARDOUS NOISE ENVIRONMENTS

Working around large equipment (e.g., drill rig, jack hammer, pumps, etc.) often creates excessive noise. The effects of noise can include physical damage to the ear, pain, and temporary and/or permanent hearing loss. Workers can also be startled, annoyed, or distracted by noise during critical activities.

The Corporate Health and Safety Officer will monitor employee exposure to hazardous noise levels from time to time as part of the hearing conservation program. All equipment that generates hazardous noise levels will be identified and the appropriate hearing protective devices utilized as required by DA Pam 40-501. Hearing protection is required anytime noise levels exceed 85 decibels on the A-weighted scale (85 dBA). However, for the purposes of this plan, hearing protection (i.e., ear plugs or ear muffs) will be worn at all times when normal conversation becomes difficult at distances of 3 feet or less. Posting the area with hazardous noise placards may also be used.

5.8 FLAMMABLE AND EXPLOSIVE ENVIRONMENTS

Soil invasive operations increase the potential for the occurrence of elevated concentrations of volatile organic compounds which may be released if there is significant subsurface contamination. Explosive concentrations of these constituents could develop in small and confined spaces. Where specified, explosivity must be continuously monitored with a Combustible Gas Indicator (CGI) positioned close to the gas source with the alarm set at 10% LEL. CGI readings should be taken every 15 minutes.

Field operations will cease if concentrations exceed 10% of the Lower Explosive Limit (LEL), and personnel will withdraw to a position upwind of the affected area based on the wind direction at the time of field operations.

5.9 WATER HAZARDS

Sampling from surface water may require the collection of water and sediment samples away from banks/shores. Such collection may require the use of a rubber boat or similar craft to allow the sampling team access to areas away from banks/shores. The following guidelines will be observed during such sampling activities.

1. Each person assigned to perform sample collection shall wear a U.S. Coast Guard Type I or Type II personal flotation device (life preserver) which is certified to keep the user upright when in use. This is in addition to all other required PPE.

2. The craft selected for use shall be rated to carry at least one person more than the actual number of persons who will be in the craft. This craft shall possess side walls (gunwales) and other protection to help prevent personnel from falling overboard.

3. The size of the sampling team shall be kept to a minimum consistent with the sample collection requirements, but shall include at least two people.

4. Sampling shall be performed in a manner such that personnel will not be required to lean beyond the craft in an unsafe manner.

5. At no time shall sampling personnel stand or move about unnecessarily. Distribution of personnel and materials within the craft shall keep the craft trim and avoid listing or other indications of unbalanced load distribution.

6. While engaged in over water tasks, horseplay of any type shall not be tolerated.

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6.0 MONITORING PLAN

6.1 GENERAL

This section of the Health and Safety Plan outlines monitoring strategies and analytical methods which will be used to assess employee exposures to chemical and physical hazards. When laboratory analysis is required, analyses will be performed by a laboratory accredited by the American Industrial Hygiene Association (AIHA). The laboratory must be a current participant in the AIHA Proficiency Analytical Testing (PAT) program.

Monitoring can be conducted to assess exposure of onsite workers to airborne contaminants and emissions of those contaminants to the community areas. A community area is defined as an area outside the immediate control of the project. Community areas include both those on the facility and areas outside the controlled work areas. Worker exposure monitoring is detailed in Section 6.2 below. Release of contaminants to the community can be monitored through the determination of airborne levels of contaminants present at the boundary of the controlled area. Monitoring results can be evaluated against established action level criteria to determine the significance of the release. In the event that concentrations of contaminants released at the work area boundary exceed established action levels, appropriate mitigation measures will be implemented as directed by the SSO or the Task Manager, or onsite work will cease. All monitoring will be conducted under the guidance of the SSO.

6.2 EMPLOYEE MONITORING

Monitoring must always be sufficient to properly characterize any employee exposure and provide knowledge of site conditions in enough detail to determine PPE requirements as work progresses. A monitoring program can consist of onsite quantification of exposure using direct reading instruments and sample collection for laboratory analysis. Both methods may be used to optimize the collection of exposure assessment data. The employee exposure assessment will be supplemented with medical monitoring during the annual physical examination by the occupational physician. Evidence of adverse exposure trends and fitness for duty will be reported to Health and Safety.

6.2.1 Chemical Exposure

In order to assess the concentrations of airborne organic vapors which may be released during soil invasive activities or present in confined spaces, either a flame ionization detector (FID) or a photoionization detector (PID) will be used. To assess the airborne concentrations of hazardous gases and vapors which may be present or released during confined space entry, either a multigas detector or multiple single-gas detectors will be used. The selected instrument or instruments (See Table 6-1) will be used to assess worker breathing zone concentrations of expected contaminants. Monitoring will be conducted as specified in Table 6-2. The action levels shown in Table 6-2 provide guidance for the selection of appropriate respiratory

TABLE 6-1
AIR CONTAMINANT MONITORING INSTRUMENTATION

Instrument	Manufacturer/Model	Substances Detected
Photoionization Detector (PID)	H-Nu PI-101 Photovac MicroTIP MSA Photon ThermoEnvironmental OVM	Aromatic and alkyl aromatic hydrocarbons (BTXE), chlorinated hydrocarbons, olefins, middle petroleum distillates
Flame Ionization Detector (FID)	Foxboro OVA 108 Foxboro OVA 128	Combustible vapors and gases, hydrocarbons
Multigas Detector	Neotronics Exotox-55 ISC TMX-410 GasTech GX-91 MSA 360 or 361	Oxygen, % Lower Explosive Limit (combustible and flammable vapors and gases), hydrogen sulfide, methane, carbon monoxide
Detector Tube Kit	Draeger 81-01231 Benzene 2/a	Benzene only, 2-20 parts per million

TABLE 6-2
MONITORING PROGRAM ACTION LEVELS

Parameter	Location and Interval	Response Level	Response
Hydrogen sulfide	Inside confined spaces and at the breathing zone, every 15 minutes	<5 ppm	Continue Level D/D modified work and continue monitoring
Hydrogen sulfide	Inside confined spaces and at the breathing zone	>5 ppm	Cease work, exit, and contact SSO
Hydrocarbons (Total by FID or PID)	Breathing zone and inside confined spaces, every 15 minutes	10* (<15) ppm above background	Continue Level D/D modified work and continue monitoring
Hydrocarbons (Total by FID or PID)	Breathing zone and inside confined spaces, every 15 minutes	10* (>15 ppm) <50 ppm above background	Contact SSO, upgrade PPE to Level C, organic vapor cartridge
Hydrocarbons (Total by FID or PID)	Work area and inside confined spaces	>50 ppm	Cease work, exit, and contact SSO
Chlorinated hydrocarbons (Total by PID)	Breathing zone and inside confined spaces, every 15 minutes	<15 ppm above background	Continue Level D/D modified work and continue monitoring
Chlorinated hydrocarbons (Total by PID)	Breathing zone and inside confined spaces, every 15 minutes	>15 ppm <50 ppm above background	Contact SSO, upgrade PPE to Level C, organic vapor cartridge
Chlorinated hydrocarbons (Total by PID)	Work area and inside confined spaces	>50 ppm	Cease work, exit, and contact SSO
Oxygen	Breathing zone and inside confined spaces, every 15 minutes	19.5 - 25%	Continue work and continue monitoring
Oxygen	Breathing zone and inside confined spaces	<19.5% or >25%	Cease work, exit, and contact SSO
Explosivity %LEL	Work area and inside confined spaces, every 15 minutes	<10% LEL	Continue work and continue monitoring
Explosivity %LEL	Work area and inside confined spaces	>10% LEL	Cease work, exit, and contact SSO

* When performing tasks at AREEs with potential petroleum hydrocarbon contamination (e.g., USTs), if 10 parts per million (ppm) above background is detected in the breathing zone of personnel, colorimetric detector tubes will be used to monitor for the presence of benzene. If no benzene is detected, an action level of 15 ppm total hydrocarbons will be enforced for upgrade to Level C. If any indication of benzene is noted, upgrade to Level C is required immediately.

protection. Where the presence of methane is suspected, monitoring for explosivity will be accomplished using a CGI which measures the percentage of the lower explosive limit (% LEL).

Personal samples to evaluate employee exposure to hazardous chemicals will be collected at the discretion of the Corporate Health and Safety Officer when direct reading instruments do not adequately assess the exposure. Air samples will be collected in accordance with NIOSH sampling protocols. The Corporate Health and Safety Officer will determine monitoring requirements based upon potential contaminants, nature of the tasks, and the results of previous sampling.

Where possible, the use of engineering controls (e.g., ventilation, wetting/foaming vapor suppression agents, etc.) is encouraged to control the airborne concentrations of contaminants.

6.2.2 Noise Exposure

Exposure to excessive noise can damage the hearing apparatus and cause permanent hearing loss. It is the intent of Earth Technology to prevent hearing loss from noise exposure.

All equipment that generates hazardous noise levels will be identified and the appropriate hearing protective devices used as required by DA Pam 40-501. When noise levels exceed 85 dBA, workers are required to use appropriate hearing protection (i.e., ear plugs or ear muffs) when normal conversation becomes difficult at distances of 3 feet or less. Posting the area with hazardous noise placards may also be used.

All Earth Technology field personnel who are medically monitored participate in a hearing conservation program. This program is mandatory for employees whose 8-hour equivalent noise exposure exceeds 85 dBA (L_{eq} > 85 dBA). The hearing conservation program includes the following elements.

1. Baseline survey of noise exposures.
2. Baseline audiometric testing.
3. Annual audiometric testing.
4. Annual training on the use and need for hearing protection.
5. Distribution of hearing protectors to employees in the program.
6. Maintenance of records.

6.2.3 Heat Stress Monitoring

In hot, sunny, humid environments there is a high potential for heat stress to pose a significant safety hazard to workers. This is especially true where the use of mandated protective clothing limits the body's ability to dissipate heat through the evaporation of sweat. In order to mitigate the effects of heat stress, it will be necessary to establish work routines which incorporate appropriate rest (cool down) periods to allow workers to remove protective clothing, drink fluids (vital when heavy sweating is occurring), and rest. The frequency and length of such work breaks must be determined for the individual based on factors such as ambient temperature, wind velocity, humidity, sunshine, the amount of physical labor being performed, the physical

condition of the worker, and the protective clothing being worn. In any case, breaks must be sufficient to prevent workers from developing symptoms of heat stress, which can include irritability, confusion, lethargy, headache, nausea, etc.

Workers must be encouraged to immediately report any difficulties or heat-related problems which they may experience or observe in fellow workers. Supervisors should use such information to alter the work/rest schedule to accommodate differences in workers and resolve such problems. During breaks, workers should be encouraged to drink plenty of water or other liquids to replace lost fluids and help cool off.

Unless specifically excepted by the SSO, all onsite personnel shall use the buddy system. Buddies shall maintain visual contact with each other. Buddies must observe each other and be alert for signs of heat stress or toxic exposure, including both visual and nonvisual effects of toxic exposure, such as:

1. Changes in complexion and skin discoloration.
2. Changes in coordination or demeanor.
3. Excessive salivation and pupillary response.
4. Changes in speech pattern.
5. Headaches, dizziness, blurred vision.
6. Nausea, cramps.
7. Irritation of eyes, skin, or respiratory tract.

Anyone exhibiting symptoms should be taken immediately to the nearest medical facility, taking steps to cool the person during transportation, including removing clothing, applying cool water to the skin, placing in air conditioned space, etc.

As the body becomes unable to effectively remove excess heat, a variety of symptoms and effects will occur. These can include the following, in order of increasing severity.

- **Heat Cramps**. Heat cramps are caused by heavy sweating and inadequate electrolyte replacement. Signs and symptoms include muscle spasms and pain in the hands, feet, and abdomen.

- **Heat Exhaustion**. Heat exhaustion occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include:

  1. Pale, cool, moist skin.
  2. Heavy sweating.
  3. Dizziness.
  4. Nausea.
  5. Fainting.

- **Heat Stroke**. Heat stroke is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action

must be taken to cool the body before serious injury or death occur. Competent medical help must be immediately obtained. Signs and symptoms of a true medical emergency are:

1. Hot, usually dry, skin, often red or blotchy.
2. Lack of or reduced perspiration.
3. Nausea.
4. Dizziness and confusion, disorientation.
5. Strong, rapid pulse initially.
6. Coma.

One or more of the following control measures can be used to help control heat stress.

1. Employees should drink plenty of water throughout the day and should increase their salt intake slightly by salting their food a little more heavily.

2. Onsite drinking water will be kept cool, 10-15°C (50-60°F), to encourage personnel to drink often.

3. A work regimen that will provide adequate rest periods for cooling down will be established, as required.

4. All personnel will be advised of the dangers and symptoms of heat stroke and exhaustion.

5. Cooling devices such as vortex tubes or cooling vests can be worn beneath protective garments.

6. Supervisors shall reinforce training daily for workers to monitor themselves and their co-workers for the effects of heat disorders and to take additional breaks, as needed.

7. All breaks are taken in a protected rest area.

8. Employees shall not conduct other tasks during rest periods.

9. Employees shall remove impermeable garments during rest periods.

10. All employees shall be informed of the importance of adequate rest, acclimatization, and proper diet in the prevention of heat stress.

6.2.4 Working in Cold Environments

Most cold-related worker fatalities have resulted from failure to escape low environmental air temperatures or from immersion in low temperature water. The single most important aspect of

life-threatening hypothermia is a fall in the deep core temperature of the body. Frost-bite may also occur. These conditions are described below.

Hypothermia. The signs and symptoms of hypothermia include shivering, dizziness, numbness, confusion, weakness, impaired judgment, impaired vision, and drowsiness. The stages are:

- Shivering
- Apathy
- Loss of consciousness
- Decreasing pulse rate and breathing rate
- Death.

As a hypothermia progresses, the victim may move clumsily and have trouble holding things. In the later stages, he or she may stop shivering.

If anyone exhibits the symptoms of hypothermia, call EMS. The victim of hypothermia should be removed from the cold and into dry clothing. Warm up his or her body slowly. Give nothing to eat or drink unless the victim is fully conscious.

Employees should be protected from exposure to cold so that the deep core temperature does not fall below 36°C (98.6°F.) A lower body temperature will very likely result in reduced mental alertness, reduction in rational decision making, or loss of consciousness with the threat of fatal consequences. The following work practices are mandatory and will help protect against cold stress.

- **Below 7°C (45°F).** Workers shall be provided with warm clothing, such as mittens and heavy socks. Protective clothing may be used to provide warmth.

- **Below 4°C (40°F).** Depending on employee comfort, clothing for warmth shall be provided in addition to protective clothing. This will include:

  1. Insulated suits, such as whole-body thermal underwear

  2. Wool socks or polypropylene socks to keep moisture off the feet if there is a potential for work activity which would cause sweating

  3. Insulated gloves

  4. Insulated boots

  5. Insulated head cover, such as knit caps.

- **Below 2°C (35°F).**

  - If the clothing of an employee might become wet on the job site, the outer layer of the clothing must be impermeable to water.

- If an employee's underclothing (socks, mittens, etc.) becomes wet in any way, the employee must change into dry clothing immediately. If the clothing becomes wet from sweating, the employee may finish the task which caused the sweating before changing into dry clothing.

- Employees must be provided a warm area, warmer than 18°C (65°F) to change from work clothing into street clothing.

- Employees must be provided a warm break area, warmer than 15°C (60°F).

- Hot liquids, such as soups, and warm, sweet drinks, etc., shall be provided in the break area. The intake of coffee shall be limited because of the attendant diuretic and circulatory effects.

- The buddy system shall be practiced at all times. Any employee observed with severe shivering shall leave the cold area immediately.

- Employees should layer their clothing, i.e., wear thinner, lighter clothing next to the body with heavier clothing layered outside the inner clothing.

- Avoid overdressing when going into warm areas or when performing activities which are strenuous. This could lead to heat stress problems.

- Employees handling volatile liquids (gasoline, hexane, alcohol, etc.) shall take special precautions to avoid spilling or splashing the liquids on clothing or gloves because of the added danger of cold injury from evaporative cooling.

Frostbite. Frostbite is the most common injury caused by exposure to cold. It happens when ice crystals form in body tissues, usually the nose, ears, chin, cheeks, fingers, or toes. This restricts blood flow to the injured parts. The effect is worse if the frostbitten parts are thawed and then frozen.

The first sign of frostbite may that the skin is slightly flushed. The skin color of the frostbitten area then changes to white or grayish yellow and finally grayish blue, as the frostbite develops. Pain is sometimes felt early on, but later goes away. The frostbitten part feels very cold and numb. The victim may not be aware of the injury.

Frostbite has degrees of tissue damage. Mild frostbite looks white or grayish, and the skin feels hard, even though the underlying tissue feels soft. In moderate frostbite, large blisters form on the surface and in the tissues underneath. The frostbitten area is hard, cold, and insensitive. If freezing is deeper than the skin, tissue damage is severe. Gangrene may result from the loss of blood supply to the area.

If anyone exhibits these symptoms, the victim should be transferred to a warm place. Put the frozen parts in warm (100-105 degrees Fahrenheit) but not hot water. Handle them gently, and do not rub or massage them. If the toes or fingers are affected, put dry, sterile gauze between them after warming them. Loosely bandage the injured parts. If the part has been thawed and refrozen, it should be rewarmed at room temperature.

6.3 Maintenance and Calibration of Equipment

All monitoring equipment will be maintained and calibrated in accordance with manufacturer recommendations. All pertinent data will be logged and maintained on site for the duration of site activities. Calibration procedures are covered in the Work Plan (TETC, 1993).

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7.0 PERSONAL PROTECTIVE EQUIPMENT

7.1 PERSONAL PROTECTION CLOTHING

The harmful effects that chemical substances may have on the human body often necessitate the use of protective clothing. Proper selection of PPE depends upon a number of factors. Protection against different types of chemicals and differing concentrations of those substances can be quite varied. The work function and the probability of exposure to the substance must also be considered when specifying protective clothing.

Once the specific hazard has been identified, appropriate clothing can be selected. The protection level assigned must match the hazard confronted. Protective clothing ensembles range from safety glasses, hard hats, and safety shoes to fully encapsulating suits with a supplied source of breathing air. Selection of appropriate PPE and upgrade criteria will be specified in Appendix A.

7.1.1 Head Protection

Employees will wear hard hats if potential exists for exposure to flying or falling objects, or when working around heavy equipment. Hard hats are mandatory when working in exclusion zones to provide protection during operation of heavy equipment. Ear protection and face shields may be attached to hard hats.

7.1.2 Eye Protection

At a minimum, eye protection will be worn inside Exclusion Zones at all times. This will consist of either approved safety glasses, or a full-face respirator (worn as required). Protectors will meet ANSI-Z87.1-1989 standards for industrial safety eyewear.

Suitable eye protection will be provided where machines or operations present danger from flying or falling objects, direct or reflected brightness (glare), hazardous liquids, injurious radiation, or a combination of these hazards.

Eye protection will meet the following minimum requirements.

1. Provide adequate protection against the particular hazards for which they are designed.

2. Be reasonably comfortable when worn under the designated conditions.

3. Fit snugly and not unduly interfere with the wearer's movements.

4. Be durable.

5. Be easily cleaned and disinfected.

Contact lenses do not provide adequate eye protection and are not allowed to be worn on hazardous waste sites.

Persons whose vision requires correction and are required to wear eye protection may wear goggles or spectacles of one of the following types.

1. Spectacles whose protective lenses provide optical correction (Rx).

2. Goggles that can be worn over corrective (Rx) spectacles without disturbing the adjustment of the spectacles.

3. Goggles that incorporate corrective (Rx) lenses mounted behind the protective lenses.

7.1.3 Ear Protection

Appropriate hearing protection, including ear plugs, canal caps, or ear muffs, will be required when noise may be a problem, such as around heavy machinery, power equipment, and impact tools or when normal conversation becomes difficult at distances of 3 feet or less. When employees may be exposed to hazardous noise, a hearing conservation program will be implemented in accordance with 29 CFR 1910.95.

7.1.4 Foot Protection

Employees will wear appropriate foot protection while working on site, which will consist of leather or water- and chemical-resistant boots with safety toes. Footwear (including leather work boots and chemical-resistant boots) must meet the specifications of ANSI Z41.1-1969, which is the standard for industrial footwear with safety toe. Protection against liquid hazardous chemicals requires boots of neoprene, polyvinyl chloride (PVC), butyl rubber, or other material selected for resistance to the specific chemical. For tasks where contact with contaminated materials is expected to be slight or nonexistent, leather work boots with safety toes are appropriate.

Due to the potential hazards posed by snake bites while working at WRF, personnel will also be required to use snake chaps. These are knee-length leg guards which prevent snake bites from puncturing the skin. They are worn fastened at the ankle and calf, beneath any chemically protective outer wear which may be required.

7.1.5 Hand Protection

Employees will use appropriate hand protection when exposed to hazards that could cause injury to the hands. Gloves must resist puncturing and tearing as well as provide the necessary chemical resistance.

Heavy leather gloves may be worn over chemical-protective gloves when doing heavy work. If they become contaminated, they should be discarded because leather is difficult to decontaminate.

Protective clothing should be worn over glove cuffs and sealed with tape to the gloves to prevent any liquid from spilling into the gloves. A pair of inner gloves adds an extra layer of protection for the hands during the removal of outer gloves and other chemically protective items and will be worn at all times when outer protective gloves are required.

7.1.6 Body Protection

Protective clothing and body protection is selected on the basis of the tasks to be performed and the hazards, both chemical and physical, to which the worker may be exposed. For all work areas, including the "clean" support and administrative areas, appropriate work clothing will be worn which at least covers from the knees to shoulders. Tank and halter tops are not appropriate. Bathing suits, shorts, and cut-off pants are not appropriate.

In more hazardous work areas, substantial pants and long sleeves are appropriate. Where the fire hazard is extreme, fire-safe coveralls, such as Nomex™, will be selected and worn. Chemical-protective body protection will be selected using predicted chemical exposures and the clothing manufacturer's chemical-specific permeation and degradation information to provide optimum protection.

7.1.7 Inspection of Protective Ensembles

Each piece of the personal protective ensemble will be inspected as follows.

1. Inspection and operational testing upon receipt from supplier.
2. Inspection as it is issued to workers.
3. Inspection after use and prior to cleaning and maintenance.
4. Periodic inspection of stored equipment.
5. Inspection in use to ensure effectiveness in work situation.

At the control point to entry into Exclusion Zones, the attendant at the control point will check each person entering to ensure that all required protection is in place, being worn effectively, and is fully functional.

7.2 LEVELS OF PROTECTION

Often, personal protective equipment is required for protection from more than one hazard. Common assemblies of personal protective equipment have evolved in the contaminated waste practice. These assemblies are known as "Levels of Protection" (LOP).

The designated Levels of Protection are, in increasing complexity: D, C, B, and A. These ensembles provide progressively increasing protection against chemical hazards. The specific

equipment comprising an LOP will vary slightly, but the LOPs are primarily defined by the type of respiratory protective equipment used, and secondarily by skin protection.

7.2.1 Level D

Level D protection is the lowest level of personal protection allowed on site. Respiratory protection is not required, as the atmosphere is assumed to be breathable and uncontaminated. Hard hats are required if there is the potential for overhead hazards, especially around heavy equipment. A face shield and/or safety glasses will also be worn.

Criteria for Selection of Level D Protection

The use of Level D protective equipment is warranted if all of the following conditions are met.

1. Total hydrocarbon and other contaminant concentrations have not been measured above the Level C upgrade action levels specified for the work location in Appendix A.

2. No splashes, immersion, or potential for unexpected inhalation of any chemicals are associated with work activities.

Level D protection is primarily a work uniform. It can be worn in areas where only boots may be slightly contaminated and there are no inhalable toxic substances.

Typical Level D Equipment List

1. Coveralls or similar heavy duty work clothing (no shorts/tank tops).
2. Hard hat.
3. Snake chaps.
4. Safety glasses (face shield may be worn over safety glasses).
5. Safety-toe work boots (safety boots).
6. Hearing protection (as required).
7. Full-face air purifying respirator (available for emergency use).

If the potential exists for contact with chemical contaminants (e.g., splashes, "dirty operations," etc.), but the respiratory hazard is low, the use of a Modified Level D ensemble is appropriate. Modified Level D consists of protective clothing to preclude hazards due to contact with contaminated materials, but does not provide increased respiratory protection. The use of protective clothing in a Modified Level D ensemble can also serve to aid in personal cleaning and decontamination efforts through the use of disposable outer protective garments.

Typical Modified Level D Equipment List

1. Chemical-resistant disposable outer coveralls (e.g., Tyvek™ or polyethylene-coated Tyvek™ coveralls).
2. Work clothing (worn beneath outer coveralls).

3. Chemical-resistant (e.g., nitrile) outer gloves (taped to outer coveralls).
4. Snake chaps (worn beneath outer coveralls).
5. Chemical-resistant (e.g., latex or PVC) inner gloves.
6. Butyl apron (optional, for use where splash potential is high).
7. Hard hat.
8. Safety glasses and/or face shield.
9. Chemical-resistant safety boots (taped to outer coveralls).
10. Hearing protection (as required).
11. Full-face air purifying respirator (available for emergency use).

7.2.2 Level C

Level C protection is defined by the use of a full-face, air-purifying respirator. This level of protection can be used when low levels of contaminants of a known nature are present, sufficient oxygen is available, and contaminants are not considered immediately dangerous to life or health (IDLH). Cartridges will be selected as appropriate for the hazard. For many hazardous waste operations with a mixture of contaminants, the organic vapor/high-efficiency particulate air cartridges, color-coded yellow and magenta, will be selected.

Typical Level C Equipment List

1. Full-face air-purifying respirator (FAPR).
2. Chemical-resistant disposable outer coveralls (e.g., Tyvek™ or polyethylene-coated Tyvek™ coveralls).
3. Work clothing (worn beneath outer coveralls).
4. Snake chaps (worn beneath outer coveralls).
5. Chemical-resistant (e.g., nitrile or Silver Shield® for PCB exposure) outer glove (taped to outer coveralls).
6. Chemical-resistant (e.g., Latex/PVC or nitrile for PCB exposure) inner gloves.
7. Butyl apron (optional, for use where splash potential is high).
8. Hard hat.
9. Chemical- resistant safety boots (taped to coveralls).
10. Hearing protection (as required).
11. Self-contained breathing apparatus (available for emergency rescue).

7.2.3 Level B

Level B protection requires the use of a supplied-air respirator and chemical-resistant clothing designed specifically for contact with potential site contaminants. The respirator may be an air-line type or a self-contained breathing apparatus (SCBA).

Level B is recommended for initial site entries in unknown environments, confined space work, and environments with oxygen deficiencies. Level B should be used in environments of unknown contamination; however Level B **cannot** be used in environments where explosive gas and vapors exceed 10 percent of the LEL or airborne contaminant concentrations are greater than 1,000 times the site action level concentrations for use of respiratory protection (Level C upgrade).

Typical Level B Equipment List

1. Supplied-air respiratory protective equipment.
2. Manifold and Cascade systems.
3. Chemical-resistant disposable outer coverall with hood (e.g., polyethylene-coated Tyvek™ or SARANEX® coveralls).
4. Work clothing (worn beneath outer coveralls).
5. Snake chaps (worn beneath outer coveralls).
6. Chemical-resistant (e.g., nitrile or Silver Shield® for PCB exposure) outer glove (taped to outer coveralls).
7. Chemical-resistant (e.g., PVC/Latex or nitrile for PCB exposure) inner gloves.
8. Hard hat.
9. Chemical-resistant safety boots.
10. Chemical-resistant boot covers (taped to outer coveralls).
11. Hearing protection (as required).

7.2.4 Level A

The use of Level A PPE will not be required for this project.

7.3 USING LEVEL B AND LEVEL C PPE

All persons entering the exclusion zone shall put on the required personal protective equipment according to established procedures in this plan to minimize exposure potential. When leaving the exclusion zone, PPE shall be removed according to these established procedures to minimize the spread of contamination.

7.3.1 Donning Procedures, Level B and Level C

1. Remove street clothes and store in a clean location.
2. Put on disposable underwear and coveralls or rain gear.
3. Put on boots and boot covers and tape the coveralls.
4. Put on gloves.
5. Tape the coveralls over the gloves at the wrist.
6. Don respirator and check for secure fit.
7. Put hood or head covering over the respirator.
8. Put on remaining protective equipment, such as hard hat, etc.

One person shall remain outside the work area to help workers don PPE. Other duties for the person remaining outside the work area include:

1. Checking each person entering to ensure all required protective equipment is in place.

2. Checking that all PPE fits and functions properly.

3. Log all entries and exits.

No persons shall be allowed to enter an Exclusion Zone improperly attired.

7.3.2 Doffing Procedures, Level B and Level C

Whenever a person leaves the work site, the following proper decontamination sequence will be followed.

1. Upon entering the Contamination Reduction Zone (CRZ), rinse contaminated mud and debris from boots or remove boot covers.

2. Clean reusable protective equipment.

3. Remove protective garments and equipment and respirator. All disposable clothing should be placed in plastic bags and labeled as contaminated waste.

4. Wash face and neck.

5. Proceed to the clean area and dress.

6. Clean respirator and prepare for next use.

7. Proceed to the sign out point.

All disposable equipment, garments, and personal protective equipment shall be double-bagged in 6-mil plastic bags, properly labeled and disposed.

8.0 FIELD DECONTAMINATION

8.1 GENERAL

Decontamination of equipment and personnel will be performed to control contaminant migration from waste site operations.

Decontamination procedures involve the physical removal and/or neutralization of harmful contaminants. The extent of decontamination necessarily depends on the hazard and the quantities of the contaminant.

Personal contamination can occur from:

1. Contacting vapors, gases, mists, or airborne particulates.
2. Splashes while sampling or opening containers.
3. Walking or driving through puddles or on contaminated soil.
4. Handling contaminated instruments or equipment.
5. Assisting contaminated personnel during routine operations, decontamination procedures, and emergencies.

All decontamination will be done by personnel in protective gear appropriate for the level of decontamination as determined by the SSO. The decontamination work tasks may be split or rotated among support and work crews.

Decontamination will be performed only at designated decontamination stations. Separate stations may be set up for equipment and personnel. A CRZ will be established around the decontamination areas. Personnel and equipment must move through this corridor and the stages of decontamination.

8.2 EMPLOYEE DECONTAMINATION

The purpose of decontamination is to limit the spread of contaminated materials from the exclusion zone. Consequently, decontamination procedures shall be followed anytime the exclusion zone is entered. This is accomplished through a step-by-step procedure whereby the used protective clothing and equipment is either washed or discarded. The SSO or his/her appointed representative should exercise judgment in establishing the decontamination area. Monitoring during work activities may indicate the need for additional stations under certain conditions. It is also possible that stations may be combined. Allowances must be made for the type of protective equipment being worn; for example, nondisposable, safety-toe outer boots need not be removed if properly decontaminated.

8.2.1 Level D Decontamination

Since Level D will be used only where there is no significant contamination present, no specific decontamination will be required. However, personnel should still wash hands and face when leaving the work area for hygienic purposes and to preclude the presence of any contamination.

8.2.2 Modified Level D Decontamination

The following procedures should be implemented if the exclusion zone is entered. During rest breaks **only**, if no significant contamination is noted, Station 3 can be modified to include removal of outer gloves only. It will not be necessary to completely remove all protective clothing. Instead, coveralls may be left on and loosened or opened to aid cooling. Inner gloves may be removed.

Station 1: Segregated Equipment Drop

Deposit equipment used on site (tools, sampling devices and containers, monitoring equipment, radios, clipboards, etc.) on a plastic drop cloth or in separate containers with plastic liners. Each piece of equipment will be contaminated to a different degree. Segregation at the drop reduces the probability of cross contamination.

Equipment:
- Plastic drop cloths
- Various sized containers
- Plastic liners.

Station 2: Outer Garment, Boot, and Glove Wash and Rinse

Scrub outer boots and gloves with decontamination solution or detergent/water. Rinse gloves, boots, and garment with hand pump spray device.

Equipment:
- Two containers (30- to 50-gallon)
- Hand pump spray device
- Water
- Detergent
- Scrub brushes.

Station 3: Boot, Glove, and Outer Garment Removal

Boots and outer gloves are removed and placed outside the decontamination area. Inner gloves and Tyvek™ suits are deposited in separate containers lined with plastic.

Equipment:
- Containers (30- to 50-gallon)
- Plastic liners.

Station 4: Field Wash and/or Decontamination Unit

Thoroughly wash hands and face.

Equipment: Water
Wash basin/bucket
Soap.

8.2.3 Level C Decontamination

Since workers using Level C equipment will be encumbered by respiratory protective equipment (air-purifying respirator) and other protective equipment, they may require assistance to properly complete this procedure. Workers assigned to the decontamination station should use Modified Level D PPE to protect the site workers from exposure to contamination. Use of a butyl apron or other clothing which will increase protection against splashing is important, since decontamination workers may not be able to avoid getting wet.

Station 1: Segregated Equipment Drop

Deposit equipment used on site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in separate containers with plastic liners. Each piece of equipment will be contaminated to a different degree. Segregation at the drop reduces the probability of cross contamination.

Equipment: Various sized containers
Plastic liners
Plastic drop cloths.

Station 2: Outer Garment, Boot, and Glove Wash and Rinse

Scrub outer boots, gloves, and chemical-resistant suit with decontamination solution or detergent/water. Rinse gloves, boots, and garment with clean water into plastic bucket.

Equipment: Two containers (30- to 50-gallon)
Water
Detergent
Long-handled scrub brushes.

Station 3: Outer Boot Removal

Remove outer boots (i.e., boot covers - if worn) with accompanying tape. Tape should be placed in a container with a plastic liner. Outer gloves and inner boots should be scrubbed with a decontamination solution and rinsed with clean water.

Equipment: One container (30- to 50-gallon)
Plastic liners
Scrub brushes
Water
Detergent.

Station 4: Canister/Cartridge Change

If a worker leaves the Exclusion Zone to change a canister/cartridge on his/her respirator, this is the last step in the decontamination procedure. Once the worker's canister/cartridge is exchanged, new boot covers are donned with joints taped. The worker may then return to the contaminated (work) area. All used canisters or cartridges will be disposed of at the end of the work day and fresh ones installed before work starts.

Equipment: Respirator canisters/cartridges
Tape
Extra gloves
Boot covers (if worn).

Station 5: Boot, Outer Garment, and Outer Glove Removal

Remove boots and outer garment, followed by the outer gloves (always remove these last). The outer chemical-resistant garment and gloves should be deposited in a plastic-lined container.

Equipment: Container (30- to 50-gallon)
Bench or stool
Plastic liners.

Station 6: Inner Glove Wash and Rinse

Scrub inner gloves with decontamination solution or detergent/water. Rinse gloves with clean water into plastic bucket.

Equipment: Two containers (30- to 50-gallon)
Water
Detergent
Long-handled scrub brushes.

Station 7: Respiratory Protection and Inner Glove Removal

Remove the respirator, deposit used cartridges in a plastic-lined container, and wipe the facepiece with clean water and paper towels. Following this, remove the inner gloves and place in a plastic-lined container.

Equipment: Container (30- to 50-gallon)
Plastic liners
Paper towels
Detergent solution
Rinse water.

Station 8: Field Wash and/or Decontamination Unit

Wash hands and face thoroughly.

Equipment: Water
Soap
Wash basins/buckets.

8.2.4 Level B Decontamination

Since workers using Level B equipment will be encumbered by respiratory protective equipment (SCBA or air-line) and other protective equipment, each worker will require assistance from at least one helper to properly complete this procedure. Workers assigned to the decontamination station should use Level C PPE (including respirators) to protect the site workers from exposure to contamination. Use of a butyl apron or other clothing which will increase protection against splashing is important, since decontamination workers will not be able to avoid getting wet if properly performing their duties.

Station 1: Segregated Equipment Drop

Deposit equipment used on site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in separate containers with plastic liners. Each piece of equipment will be contaminated to a different degree. Segregation at the drop reduces the probability of cross contamination.

Equipment: Various sized containers
Plastic liners
Plastic drop cloths.

Station 2: Outer Garment, Boot Cover, and Glove Wash and Rinse

Scrub outer boot covers, gloves, and chemical-resistant suit with decontamination solution or detergent/water. If necessary, a spray bottle can be used to apply decontamination solution directly onto heavily soiled outer coveralls to more thoroughly decontaminate at this station. Rinse gloves, boots, and garment with clean water into a plastic bucket.

Equipment: Two containers (30- to 50-gallon)
Water
Detergent
Long-handled scrub brushes.

Station 3: Outer Boot Cover Removal

Remove outer boots cover (i.e., boot covers - if worn) with accompanying tape. Tape should be placed in a container with a plastic liner. Outer gloves and inner boots should be scrubbed with a decontamination solution and rinsed with clean water.

Equipment: One container (30- to 50-gallon)
Plastic liners
Scrub brushes
Water
Detergent
Bench or stool.

Station 4: SCBA Bottle Change-out

If decontamination is being undertaken to exit the Exclusion Zone solely to exchange an SCBA air bottle, this station will be the final step of the procedure. Once the worker's air bottle is exchanged, new boot covers are donned with joints taped. The worker may then return to the contaminated (work) area. All used air bottles will be decontaminated prior to refill and reuse.

Equipment: SCBA air bottles
Tape
Extra gloves
Boot covers (if worn).

Station 5: Boot, Outer Garment, and Outer Glove Removal

Remove boots and outer garment, followed by the outer gloves (always remove these last). The outer chemical-resistant garment and outer gloves should be deposited in a plastic-lined container.

Equipment: Container (30- to 50-gallon)
Bench or stool
Plastic liners.

Station 6: Inner Glove Wash and Rinse

Scrub inner gloves with decontamination solution or detergent/water. Rinse gloves with clean water into plastic bucket.

Equipment: Two containers (30- to 50-gallon)
Water
Detergent
Long-handled scrub brushes.

Station 7: Respiratory Protection and Inner Glove Removal

Remove the respirator and wipe the facepiece, air-line and/or SCBA assembly with clean water and paper towels to decontaminate for reuse. Following this, remove the inner gloves and place in a plastic-lined container.

Equipment: Container (30- to 50-gallon)
Plastic liners
Paper towels
Detergent solution
Rinse water.

Station 8: Field Wash and/or Decontamination Unit

Wash hands and face thoroughly.

Equipment: Water
Soap
Wash basins/buckets.

8.3 PERSONAL PROTECTIVE EQUIPMENT

Respirators that have been used should be decontaminated prior to reuse. Taken from the drop area, the masks can be disassembled, the cartridges disposed of, and the remainder placed in a cleansing solution and allowed to air dry. Personnel will inspect their own masks to be sure of proper strap readjustment for correct fit.

Certain parts of contaminated respirators, such as the harness assembly or cloth components, are difficult to decontaminate. If grossly contaminated, they may have to be discarded.

In addition to being decontaminated, all respirators, protective clothing, and other personal articles should be sanitized before they can be used again. The insides of masks and clothing can become soiled from exhalation, body oils, and perspiration. The manufacturer's instructions should be followed in sanitizing the respirator mask.

8.4 INSTRUMENTS

Monitoring equipment should be protected as much as possible from contamination. Drape, mask, or otherwise cover as much of the instruments as possible with plastic without hindering the operation of the unit.

Contaminated instruments will be taken from the drop area, their protective coverings removed and disposed in appropriate containers. Any remaining dirt or obvious contamination will be brushed or wiped with a damp disposable paper wipe in the CRZ. The units can then be placed in a clean plastic tub, taken inside, wiped with damp disposable wipes, and dried.

Be aware that many instrument manufacturers will not accept contaminated equipment for repair, and that a heavily contaminated piece of equipment, if improperly handled, may have to be disposed of as hazardous waste.

Following decontamination, the units will be checked and recharged, as necessary, for the next day's operation. They will then be prepared with new protective coverings.

8.5 Heavy Equipment

Heavy earthmoving and earth working equipment, such as backhoes or trenching machinery, can become heavily coated with soil or other contaminants. Prior to such equipment leaving a work location it must be completely decontaminated. Equipment should be thoroughly rinsed so that no visible dirt or stains remain. Some hand scrubbing may be necessary to completely remove contamination. Personnel should use Modified Level D PPE while performing decontamination activities. Regardless of the method chosen, all vehicles and equipment must be decontaminated sufficiently so that contamination will not be spread from the work location, or create the potential for exposure to unprotected personnel or the public.

8.6 Protection of Persons Performing Decontamination

The persons performing decontamination must be protected from the contaminants which they may touch or which may splash upon them. In general, persons performing decontamination will use the same or one level lower level of protection as the workers in the Exclusion Zone. For example, if the Exclusion Zone requires Level B protection, the decontamination of the personnel coming out of that Exclusion Zone can usually be performed in Level C. However, cleaning equipment may require more stringent splash protection, such as aprons, faceshields, or full-face respirators. The selection of protective equipment for persons performing decontamination must ensure their safety, yet not unduly encumber their movements.

8.7 Disposal of Decontamination Wastes

Equipment decontamination should be accomplished on a designated wash pad, or a plastic-lined location, so that all water generated can be collected. Decontamination rinse water should be containerized and characterized for disposal. Other solid and liquid decontamination wastes should also be containerized. Solids may be double bagged, or placed in a sealed drum. Liquids will be restrained during decontamination and collected. Liquids will be placed in containers, such as 55-gallon drums or Baker tanks.

8.8 DECONTAMINATION DURING EMERGENCIES

Often during emergencies the need to quickly respond to an accident or injury must be weighed against the risk to the injured party from chemical exposure. It may be that the time lost or the additional handling of an injured person during the decontamination process may cause greater harm to the individual than from the exposure that would be received by undressing that person without proper decontamination. This decision should be made by the SSO, if possible, or the designated work location safety representative.

An additional consideration to include when bypassing decontamination of injured personnel is the acceptance of contaminated personnel at emergency facilities. Many facilities will not accept contaminated patients. Site response personnel should accompany contaminated victims to the medical facility to advise on matters involving decontamination.

8.8.1 Physical Injury

Physical injuries can range from minor to life threatening. Life-saving care should be instituted immediately without considering decontamination. The outside garments can be removed (depending on the weather) if this does not cause delays, interfere with treatment, or aggravate the problem. Respiratory masks and backpack assemblies must always be removed. Chemical-resistant clothing can be cut away.

If the outer contaminated garments cannot be safely removed, the individual should be wrapped in plastic, rubber, or blankets to help prevent contaminating medical personnel and/or the inside of ambulances. Outside garments are then removed at the medical facility. No attempt should be made to wash or rinse the victim unless it is known that the person has been contaminated with an extremely toxic or corrosive material that could also cause severe injury or loss of life. For minor medical problems or injuries, the normal decontamination procedure should be followed.

8.8.2 Heat Stress

Heat-related illnesses range from heat fatigue to heat stroke, the latter being a potentially life threatening condition. Heat stroke requires prompt treatment to prevent irreversible damage to health, or death. Protective clothing may have to be cut off to allow rapid body cooling. Less serious forms of heat stress also require prompt attention or they may lead to heat stroke.

8.8.3 Chemical Exposure

Chemical exposure can be divided into two categories:

1. Direct contact through either touch or inhalation.
2. Indirect contact through gross contamination of clothing or equipment.

Injuries from contaminant inhalation can only be treated by qualified physicians. If the contaminant is on the skin or in the eyes, immediate measures must first be taken to counteract

its effect followed immediately by prompt physician care. First-aid treatment usually involves flooding the affected area with water.

When protective clothing is grossly contaminated, contaminants may be transferred to the wearer or to treatment personnel and cause injuries. Unless severe medical problems could be created by splashing, the protective clothing should be washed off as rapidly as possible and carefully removed.

9.0 SITE CONTROL AND WORK ZONES

9.1 GENERAL

Each work crew will use the "buddy system" during all work activities. In addition, the following procedures shall be observed while on site.

1. Personnel shall not enter any area identified with hazard warning signs.

2. Four-wheel drive vehicles shall be used for all off-road vehicle travel.

3. When lightning is within 10 miles, drilling rig masts shall be brought down and all personnel shall evacuate to a safe area. When winds are above 35 knots, high work should be terminated. Crane operations must be terminated when wind exceeds safe speed for crane operation.

4. All vehicles must be operated in a safe manner. Privately owned vehicles (POVs) must park in designated parking areas only and in compliance with all Virginia motor vehicle laws. Company vehicles shall not park within 25 feet of any explosive or hazardous material storage facility.

5. The use of seat belts is mandatory at all times when the vehicle is in operation.

6. Facility speed limits are strictly enforced and must be obeyed at all times.

7. All photographs or photographers must be cleared by Security.

Control will be established around each work site to prevent untrained or unprotected workers from exposure to contaminants or other hazards. The SSO or his designated work site representative will be responsible for delineating these areas based upon requirements set forth in Section 9.2, results of monitoring obtained during work operations, and site-specific conditions (e.g., proximity of roads or buildings, terrain peculiarities, etc.).

9.2 THE EXCLUSION AND CONTAMINATION REDUCTION ZONES

Work locations where ongoing operations create the potential for contact with or inhalation (above action levels) of contaminants are considered to be limited-access, controlled areas. An Exclusion Zone must be established at each such work location to prevent unauthorized access by personnel when there is the potential for exposure to contaminants. Once work begins, no one will be allowed within the Exclusion Zone without wearing the designated level of protective equipment and meeting the training and medical monitoring requirements specified in this plan.

A single entry/exit point should be established at the edge of each Exclusion Zone to facilitate control of personnel entering the area, and as the location for the set-up of decontamination stations outside the Exclusion Zone. An area 10 feet around this decontamination/entry area, but outside the boundary of the Exclusion Zone itself, should be considered as having the potential for exposure to contaminants brought out of the Exclusion Zone by work personnel, and therefore should also be access-controlled. This area will be designated as the CRZ, and should be located upwind from the work site, if possible, or else cross-wind. The CRZ should **never** be downwind from the work area. Figure 9-1 depicts a typical Exclusion/CRZ setup.

Initial requirements for Exclusion Zone setup are presented here as a guide; however, specific factors as mentioned above must also be considered. It must be emphasized that Exclusion Zone limits must be sufficient to prevent anyone outside the zone from being exposed to any contaminated materials, or airborne contaminants released during work activities in excess of action levels established in site-specific monitoring guidance. The CRZ must be large enough to encompass decontamination activities and prevent unauthorized personnel from approaching closer than is safe, typically 10 feet away from all activities (decontamination, etc.) in all directions except toward the Exclusion Zone (where full PPE use is in effect). Typical distances for initial set-up of the Exclusion Zone are provided below.

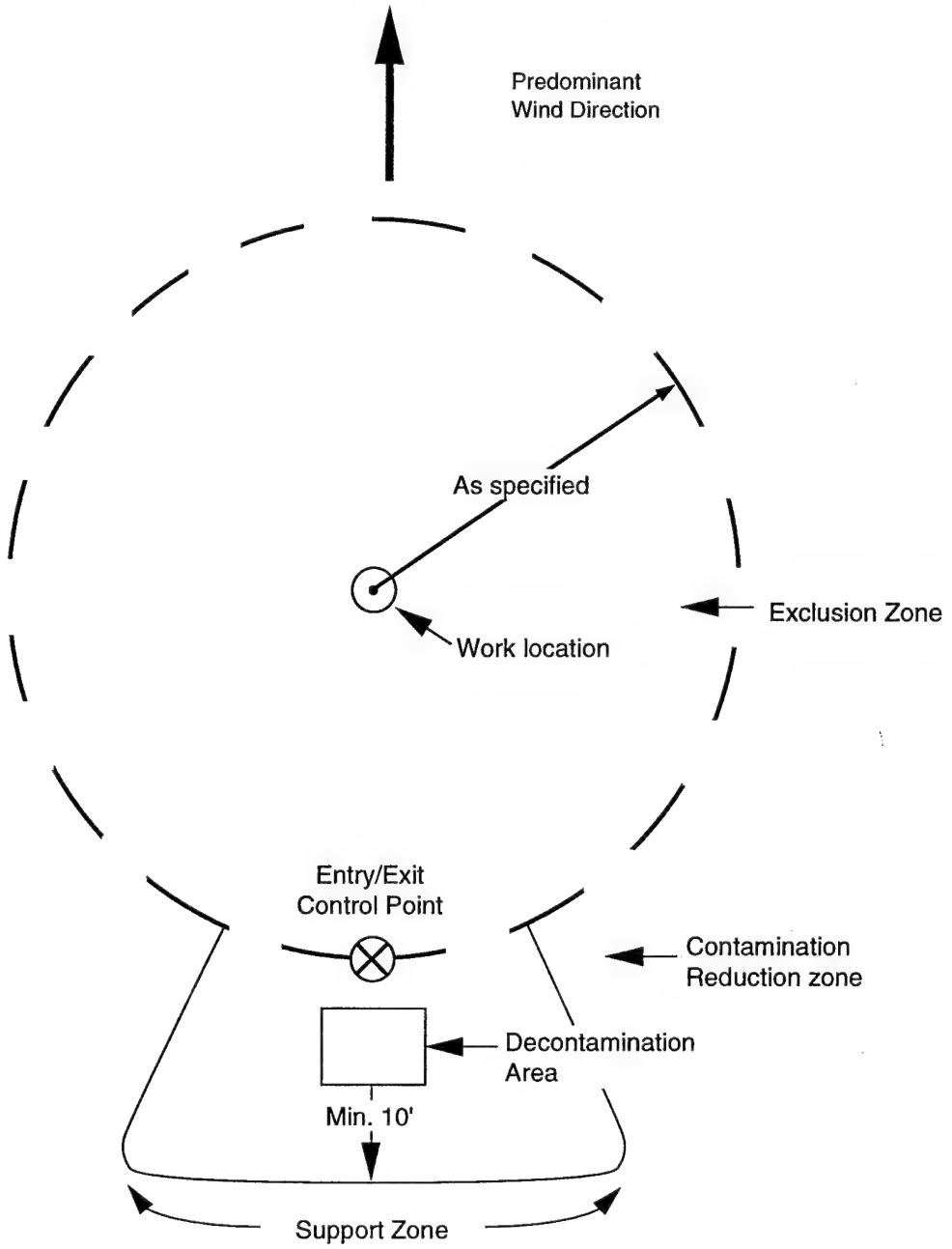
Drilling Operations: Thirty feet in all directions from potentially contaminated drilling locations. If the 30-foot Exclusion Zone cannot be properly controlled due to site conditions (e.g., presence of roads), alternative limits can be specified by the SSO provided that limits are such that there are no potential chemical or physical hazards outside the Exclusion Zone.

Surface and Shallow Soil Sampling: Ten feet in all directions from the sampling location (using visual control only, no "Caution" tape). If this is impractical, alternative limits can be established by the SSO.

Confined Spaces: Anywhere within the confined space.

Decontamination: Thirty feet in all directions from the decon area for large (vehicle, drilling equipment, etc.) efforts conducted at a decon pad. For personal and small parts decon conducted at the work site, keep decon activities within the applicable Exclusion/CRZ established for that operation.

Exclusion Zones should be delineated, where practical, using yellow "CAUTION" tape to provide a visible barrier to any non-site personnel. Placement of vehicles can be used to provide additional security. The use of "CAUTION" tape (or other visible marker) to delineate the CRZ is not required so long as access to the area is limited to work personnel only. Additionally, all personnel should maintain vigilance to prevent unauthorized, accidental entrance into controlled-access areas (Exclusion Zones and CRZs). If such an entry should occur, the trespasser should be **immediately** escorted outside the area, or all onsite work must cease. All personnel, equipment and supplies which enter controlled-access areas must be decontaminated or containerized as waste prior to leaving, through the CRZ only. At the conclusion of all hazardous site tasks, these areas must be properly cleaned so as to be nonhazardous ("clean") prior to relaxation of entry control procedures and PPE requirements.



Explanation

- Approximate Center Point
- Traffic Control Entrance
- Exclusion Boundary

The Earth Technology Corporation

Project No. 93-1976-01

Woodbridge Research Facility

Typical Work Location Area Control

6-93

Figure 9-1

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9.3 THE SUPPORT ZONE

Areas outside the controlled-access portions of the work site are considered to be the Support Zone. In this area the potential to encounter contamination is highly unlikely. The use of Level D equipment is required in this area (e.g., safety boots, hard hat, if necessary, etc.); however the wearing of other protective clothing and/or respiratory protection is not required.

The Support Zone can be used for setup and storage of all equipment, vehicles, and supplies which are not required for immediate use in the Exclusion Zone, and can serve as a work area for all nonhazardous tasks which might be undertaken (e.g., paperwork). A designated break area will also be in the Support Zone where personnel can eat, drink, smoke, etc. The break area is the only place at the work site where such activities are permitted. In most instances, the Support Zone will not be delineated in any special way, and can be regarded as the general area of the work site which is outside the controlled-access areas.

9.4 COMMUNICATIONS

Effective communication is essential to the successful completion of the project. External communication is maintained from the Earth Technology project trailer with telephone and fax links. Onsite and offsite communication can be facilitated with mobile phones where visual and vocal communications are not possible. Keep communications short and direct. All traffic is monitored, so keep all conversations appropriate for business.

9.5 EXCLUSION ZONE CONTROL RECORDS

Exclusion Zone control records will be maintained on a daily basis. Site visitors and personnel who enter the Exclusion Zones should be annotated as part of the work zone control records. These records will be recorded and maintained by the SSO and/or his/her designated onsite representative as part of the health and safety records.

Other information to be recorded will include:

1. Specific work tasks performed.
2. Details concerning monitoring efforts undertaken and results (if available).
3. Unusual events which may occur.

The SSO is responsible for periodic review of these records to assure that they are adequate and well maintained.

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10.0 HEALTH AND SAFETY OPERATING PROCEDURES

10.1 GENERAL

Eating and drinking will not be permitted inside, or within 50 feet of, the Exclusion Zones. Field workers will first wash hands and face prior to eating, drinking, or tobacco use. Consumption of alcoholic beverages or illegal drugs is prohibited at the site.

Earth Technology prohibits open flames, smoking, or the use of smokeless tobacco while in the work areas. Smoking and the use of smokeless tobacco will be permitted only in those areas designated for this purpose.

Field personnel should avoid contact with potentially contaminated substances. They should not walk through puddles, pools, mud, etc., and should avoid, whenever possible, kneeling on the ground and leaning or sitting on equipment or the ground. Monitoring equipment should not be placed on a potentially contaminated surface, including the ground.

All field crew members should make use of their senses (all senses) to alert them to potentially dangerous situations, i.e., presence of strong, irritating, or nauseating odors.

Field crew members shall be familiar with the physical characteristics of investigations, including:

1. Entering Exclusion Zones upwind from contamination sources.
2. Accessibility to equipment and vehicles.
3. Communication.
4. Hot zones (areas of known or suspected contamination).
5. Site access.
6. Nearest water sources, usually the water tank or the drill rig.
7. Emergency procedures and evacuation assembly points.
8. Location of protective and emergency equipment and relevant first-aid procedures.

The number of personnel and equipment in the contaminated area should be minimized, consistent with site operations.

10.2 EQUIPMENT SAFETY CERTIFICATIONS

Each operator, including subcontractors, of heavy equipment (drilling, trenching, earth moving equipment, etc.) and smaller powered equipment is responsible for ensuring that all equipment is maintained in proper working condition. Each operator must implement an inspection and

maintenance program in accordance with federal, state, and local requirements as applicable for each piece of powered equipment. Where such regulations do not exist, each operator is responsible for implementing an inspection and maintenance program based on industry standards or guidelines or equipment manufacturer's instructions. Guidelines for inspection and maintenance are most helpful when summarized and developed into a checklist.

10.3 Site Health and Safety Meetings

10.3.1 Site Safety Orientation

The SSO will conduct a site safety orientation for every person assigned to the project on the following occasions.

1. Before field personnel begin work at the site.

2. When there are significant revisions or modifications to the Health and Safety Plan.

3. When additional workers or subcontractors begin field work.

A record of the meetings, including attendees, will be maintained in the project health and safety file. The Corporate Health and Safety Officer will assist the SSO in developing the site safety orientation. As a minimum, the orientation and training meeting agenda must include:

1. A review of this Health and Safety Plan.

2. Verification of medical and safety training clearances, including respirator fit testing.

3. Hazard awareness of chemicals materials which may be encountered on site.

4. Fire safety training, fire extinguishment, and evacuation procedures.

5. Distribution of the Health and Safety Plan or modifications.

6. Attendee signatures to acknowledge receipt and understanding of the plan and an agreement to comply.

10.3.2 Tailgate Safety Meetings

The SSO will conduct a tailgate safety meeting at the start of each work day to review and discuss the health and safety issues associated with the work, problems encountered, and modifications to existing procedures. The SSO maintains a record of meetings and issues in the project files. All field personnel are required to attend these meetings.

10.4 Accident or Incident Reports

All accidents and incidents that occur on site during field activities associated with this project will be promptly reported to the SSO and the Task Manager. The Task Manager will provide timely notification to the Project Manager. The supervisor of the injured employee or work crew where the accident occurred will initiate the written report. For convenience, the Injury Report form in Appendix D may be used to ensure all relevant information is recorded. The Task Manager or Project Manager may complete the "Manager" section of the Injury Report and forward the Injury Report to the Earth Technology Health and Safety Section in the Washington D.C. Office. The SSO will investigate every accident or illness and, if related to work, complete the Accident/Injury Investigation form found in Appendix D. The Corporate Health and Safety Officer will assist accident investigations and Accident Review Boards. The Task Manager will ensure the Accident Review Board recommendations are implemented.

Accidents resulting in any fatality, lost-time injury or illness, hospitalization of 3 or more personnel, or property damage to government or contractor property (which occurred during the performance of the contract) equal to or exceeding $2,000.0 must be telephonically reported to USAEC, SFIM-AEC-TSS (410) 671-4811, as soon as possible, but not later than 2 hours after occurrence and reported in writing within 5 days of occurrence on DA Form 285 included in Appendix D. All other accidents/incidents must be telephonically reported to USAEC, SFIM-AEC-TSS (410) 671-4811, within 8 hours of occurrence.

10.5 Visitor Clearances

Visitors will not be allowed within Exclusion Zones unless they comply with the health and safety requirements of this plan.

10.6 Health and Safety Completion Report

The Corporate Health and Safety Officer and the SSO will prepare a health and safety completion report at the end of the project. The health and safety completion report will include:

1. Health and Safety Plan and modifications or changes.
2. Records of safety orientation and training meetings.
3. Personnel training and medical records.
4. Accident or incident reports.
5. Air quality monitoring reports.
6. Personal air monitoring results.
7. Logs of entry.
8. Other health and safety-related documentation.

This report will be reviewed, approved, and maintained by the Project Manager.

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11.0 EMERGENCY CONTINGENCY PLAN

11.1 GENERAL

There are three major categories of emergencies that could occur during site activities.

1. Illnesses and physical injuries (including injury-causing chemical exposure).
2. Catastrophic event (earthquake, fire, explosion, or chemical release).
3. Safety equipment problems.

Although a catastrophic event or severe medical emergency is unlikely to occur during work activity at the site, an emergency contingency plan has been prepared for this project should such critical situations arise. The purpose of this plan is to establish the appropriate response actions for emergency situations, the means of communication, and the responsibilities of key personnel at the site.

11.2 RESPONSIBILITIES

11.2.1 Task Manager

The Task Manager or his/her designated representative, will be the primary contact individual and coordinator of all emergency activities. He/she will be responsible for:

1. Evaluating the severity of the emergency.
2. Implementing appropriate response action.
3. Summoning appropriate emergency services (fire department, ambulance, etc.).
4. Notifying all site personnel, the SSO, and concerned authorities of the emergency situation.

11.2.2 Subcontractor

Each subcontractor will provide the Task Manager with pertinent health hazard information needed to effectively evaluate the emergency incident and recommend appropriate response actions.

11.2.3 Other Onsite Personnel

All field personnel are obligated to inform the Task Manager of all emergency situations and to abide by their issued response actions. Special medical problems of field personnel such as allergies to insects, plants, penicillin, etc. must be reported to the SSO prior to the start of field work.

11.3 Work Stoppage and Corrective Actions

The SSO will stop work and recommend corrective actions in work zones if the following conditions are encountered.

1. Air monitoring shows concentrations of airborne contaminants exceeding those outlined in Table 6-2 (Monitoring Program Action Levels).

2. Activities in the Exclusion Zone generate concentrations of airborne contaminants outside the Exclusion Zone in excess of 50 percent of the exposure limits established by Earth Technology (see Appendix C).

3. Emergency conditions directly affect the health and safety of project workers or any other persons in the area.

Corrective actions may include modification of personal protection levels, ventilation, evacuation, or other necessary measures for each site. The SSO is empowered to unilaterally stop work if necessary to meet health and safety requirements.

11.4 Medical Emergencies

11.4.1 General

Medical emergencies can be described as situations that present a significant threat to the health of personnel. These can result from chemical exposures, heat stress, cold stress, poisonous plants, and poisonous insect or snake bites. Medical emergencies must be dealt with immediately and proper care should be administered. This may be in the form of first aid and emergency hospitalization.

11.4.2 Accidents

Accidents can result from physical hazards on a site. These hazards can include tripping, catching or cutting, and may be associated with debris on a site or heavy equipment. Injuries may include:

1. Broken bones.
2. Sprains.
3. Puncture wounds.
4. Electrical shock.
5. Cut by contaminated materials.

11.5 Safety Equipment Problems

An emergency may develop due to malfunction or other problems associated with health and safety equipment being used by field personnel. These equipment problems must be corrected before proceeding with field activities. Health and safety problems that may occur include:

1. Leaks or tears in protective clothing.
2. Failure of respiratory protective devices (SCBA, air-purifying respirators).
3. Encountering contaminants for which prescribed protective equipment may not be suitable.

11.6 Emergency Equipment

Provisions will be made to have appropriate emergency equipment available and in proper working condition. This equipment will include:

1. First-aid kits.
2. Eye wash stations - fill and pressurize.
3. Fire extinguisher (20 pound A:B:C).

Equipment should be checked daily before commencing site activities, and defective equipment repaired or replaced before performing site work. Provisions should be made for backup safety equipment.

11.7 Catastrophic Event Procedures

In the event of a catastrophic incident:

1. Work activities will cease and all project personnel will be evacuated from the site. The evacuation will proceed in a direction upwind of the critically affected area with all personnel assembling in a predesignated location.

2. A headcount will be taken of the assembled employees and any injured individuals shall be administered first aid. The information on the total number, head count, injuries, etc., will be immediately conveyed to the SSO.

11.8 Medical Emergency Procedures

In the event of a medical emergency:

1. All injured individuals will be given appropriate emergency first aid by the site emergency medical designee.

2. Injured personnel shall be transported to Potomac Hospital. The phone number and address are given in Table 11-1 and the route from the site to Potomac Hospital is shown in Figure 11-1. Additional maps are shown in Figures 1-1 and 1-2. The directions to the hospital are the following: from Dawson Beach Road, take a left onto Jefferson Davis Highway (Route 1), take a right onto Opitz Boulevard, Potomac Hospital is on the right.

The designated medical facilities will be notified of the planned work activities and the potential medical emergencies likely to result from a job site accident.

TABLE 11-1
EMERGENCY TELEPHONE NUMBERS

Fire Department . . . . . 911 or (703) 494-4171
OWL Co. 12
Montgomery Avenue, Woodbridge

Ambulance . . . . . 911 or (703) 370-4101
Choice American Ambulance Service, Inc.
Alexandria, VA

Medical Care . . . . . 911 or (703) 670-1363
Potomac Hospital
2300 Opitz Blvd.
Woodbridge, VA

Police . . . . . 911 or (703) 792-6500
Garfield Police Dept.

National Capital Poison Control Center (Regional) . . . . . (202) 625-3333

Information and Response Organizations

CHEMTREC . . . . . (800) 424-9300

National Poison Control Center . . . . . (800) 458-5842

TSCA Hotline . . . . . (202) 554-1404

Centers for Disease Control (CDC) . . . . . (404) 452-4100
(404) 329-2888

National Response Center . . . . . (800) 424-8802

EPA Environmental Response Team (ERT) . . . . . (201) 321-6660

Resource Conservation and Recovery Act (RCRA) Hotline . . . . . (800) 424-9346

The Earth Technology Corporation Personnel

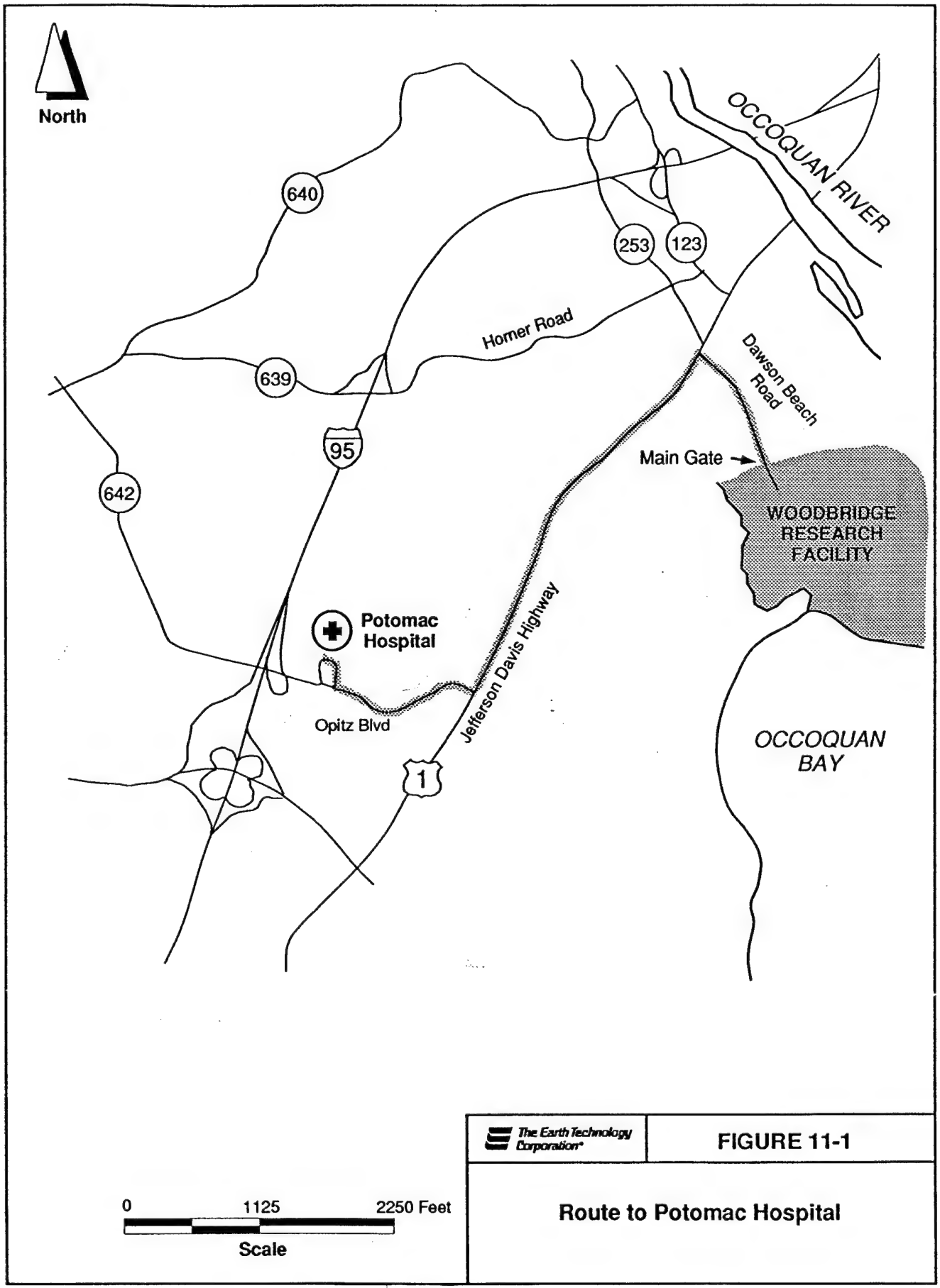
Corporate Health and Safety Officer
Glen Barrett . . . . . (703) 549-8728

Program Manager
Tom Hastings . . . . . (703) 549-8728

Project Manager
Kevin McCreanor . . . . . (703) 549-8728

U.S. Army Environmental Center

SES Branch
Mr. William Houser . . . . . (410) 671-4811



The Earth Technology Corporation

FIGURE 11-1

Route to Potomac Hospital

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SIGNATURE PAGE

I have read and reviewed the Health and Safety Plan for the Harry Diamond Laboratory, Woodbridge Research Facility Site Investigation and Remedial Investigation. I have been instructed in the contents of these documents and understand the information presented. I will comply with the provisions contained therein.

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APPENDIX A
SITE-SPECIFIC HEALTH AND SAFETY GUIDANCE

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SITE-SPECIFIC SUPPLEMENTARY HEALTH & SAFETY

This guidance is presented in summary form and is intended to provide a quick reference to supplement the requirements of the Health and Safety Plan. Work crew monitoring guidance indicates which instruments the work crew will use to monitor airborne concentrations in accordance with Table 6-2. Health and Safety Operations indicates operations to be performed by Health and Safety staff to assess exposures.

AREE 1 Landfill No. 1

Materials suspected at this location
- Metals
- PCBs
- Petroleum Products
- Asbestos

Materials likely to be found at this location
- Metals
- PCBs
- Petroleum Products
- Asbestos

Objective:	Determine the presence of the above contaminants
Task:	Geophysics and Land Surveying
PPE:	Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Groundwater Sampling
PPE:	Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None
Task:	Surface Soil Sampling
PPE:	Level C
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Soil Sampling
PPE:	Level C
Work Crew Monitoring:	FID
Health and Safety Operations:	None

SITE-SPECIFIC SUPPLEMENTARY HEALTH & SAFETY

Continued

AREE 1 Landfill No. 1 (Continued)

Task:	Borehole Installation/Sampling and Well Installation
PPE:	Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None

Task:	Excavation
PPE:	Level C
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None

Task:	Direct Push
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

SITE-SPECIFIC SUPPLEMENTARY HEALTH & SAFETY

Continued

AREE 2 Landfill No. 2

Materials suspected at this location
Metals
PCBs
Petroleum Products

Materials likely to be found at this location
Metals
PCBs
Petroleum Products

Objective: Determine the presence of the above contaminants

Task: Land Surveying
PPE: Level D
Work Crew Monitoring: None
Health and Safety Operations: None

Task: Groundwater Sampling from Existing Wells
PPE: Modified Level D
Work Crew Monitoring: Multigas Detector and FID
Health and Safety Operations: None

Task: Surface water sampling
PPE: Modified Level D
Work Crew Monitoring: None
Health and Safety Operations: None

Task: Sediment sampling
PPE: Modified Level D
Work Crew Monitoring: None
Health and Safety Operations: None

Task: Borehole Installation/Sampling and Well Installation
PPE: Modified Level D
Work Crew Monitoring: Multigas Detector and FID
Health and Safety Operations: None

SITE-SPECIFIC SUPPLEMENTARY HEALTH & SAFETY

Continued

AREE 2 Landfill No. 2 (Continued)

Task:	Direct Push
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

SITE-SPECIFIC SUPPLEMENTARY HEALTH & SAFETY

Continued

AREE 3 Landfill No. 3

Materials suspected at this location
Metals (Lead)
PCBs
Petroleum Products

Materials likely to be found at this location
Metals (Lead)
PCBs
Petroleum Products

Objective: Determine the presence of the above contaminants

Task: Geophysics and Land Surveying
PPE: Level D
Work Crew Monitoring: None
Health and Safety Operations: None

Task: Groundwater Sampling
PPE: Modified Level D
Work Crew Monitoring: Multigas Detector and FID
Health and Safety Operations: None

Task: Surface water sampling
PPE: Modified Level D
Work Crew Monitoring: None
Health and Safety Operations: None

Task: Sediment sampling
PPE: Modified Level D
Work Crew Monitoring: None
Health and Safety Operations: None

Task: Soil Sampling
PPE: Modified Level D
Work Crew Monitoring: FID
Health and Safety Operations: None

SITE-SPECIFIC SUPPLEMENTARY HEALTH & SAFETY

Continued

AREE 3 Landfill No. 3 (Continued)

Task:	Borehole Installation/Sampling and Well Installation
PPE:	Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None

Task:	Excavation
PPE:	Based upon monitoring, minimum Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None

Task:	Direct Push
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

SITE-SPECIFIC SUPPLEMENTARY HEALTH & SAFETY

Continued

AREE 4 Landfill No. 4

Materials suspected at this location
- Metals
- PCBs
- Petroleum Products

Materials likely to be found at this location
- Metals
- PCBs
- Petroleum Products

Objective:	Determine the presence of the above contaminants
Task:	Geophysics and Land Surveying
PPE:	Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Groundwater Sampling
PPE:	Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None
Task:	Surface water sampling
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Sediment sampling
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Soil Sampling
PPE:	Modified Level D
Work Crew Monitoring:	FID
Health and Safety Operations:	None

Continued

AREE 4 Landfill No. 4 (Continued)

Task:	Borehole Installation/Sampling and Well Installation
PPE:	Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None

Task:	Excavation
PPE:	Based upon monitoring, minimum Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None

Task:	Direct Push
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

SITE-SPECIFIC SUPPLEMENTARY HEALTH & SAFETY

Continued

AREE 5 Landfill No. 5

Materials suspected at this location
- Metals
- PCBs
- Petroleum Products

Materials likely to be found at this location
- Metals
- PCBs
- Petroleum Products

Objective: Determine the presence of the above contaminants

Task:	Geophysics and Land Surveying
PPE:	Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Task:	Groundwater Sampling
PPE:	Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None

Task:	Surface water sampling
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Task:	Sediment sampling
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Task:	Soil Sampling
PPE:	Modified Level D
Work Crew Monitoring:	FID
Health and Safety Operations:	None

SITE-SPECIFIC SUPPLEMENTARY HEALTH & SAFETY

Continued

AREE 5 Landfill No. 5 (Continued)

Task:	Borehole Installation/Sampling and Well Installation
PPE:	Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None

Task:	Excavation
PPE:	Based upon monitoring, minimum Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None

Task:	Direct Push
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Continued

AREE 6-A Potential Landfill

Materials suspected at this location
- Metals
- PCBs
- Petroleum Products

Materials likely to be found at this location
- Metals
- PCBs
- Petroleum Products

Objective:	Determine the presence of the above contaminants
Task:	Geophysics and Land Surveying
PPE:	Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Groundwater Sampling
PPE:	Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None
Task:	Surface water sampling
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Sediment sampling
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Soil Sampling
PPE:	Modified Level D
Work Crew Monitoring:	FID
Health and Safety Operations:	None

Continued

AREE 6-A Potental Landfill (Continued)

Task:	Borehole Installation/Sampling and Well Installation
PPE:	Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None

Task:	Excavation
PPE:	Based upon monitoring, minimum Modified Level D
Work Crew Monitoring:	Multigas detector and FID
Health and Safety Operations:	None

Task:	Direct Push
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

SITE-SPECIFIC SUPPLEMENTARY HEALTH & SAFETY

Continued

AREE 6-B Potential Landfill

Materials suspected at this location
Metals
PCBs
Petroleum Products

Materials likely to be found at this location
Metals
PCBs
Petroleum Products

Objective:	Determine the presence of the above contaminants
Task:	Geophysics and Land Surveying
PPE:	Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Groundwater Sampling
PPE:	Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None
Task:	Soil Sampling
PPE:	Modified Level D
Work Crew Monitoring:	FID
Health and Safety Operations:	None
Task:	Borehole Installation/Sampling and Well Installation
PPE:	Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None
Task:	Excavation
PPE:	Based upon monitoring, minimum Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None

Continued

AREE 6B Potential Landfill (Continued)

Task:	Direct Push
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

SITE-SPECIFIC SUPPLEMENTARY HEALTH & SAFETY

Continued

AREE 7 Pistol Range

Materials suspected at this location
Lead

Materials likely to be found at this location
Lead

Objective:	Determine the presence and mobility of lead contamination
Task:	Land Surveying
PPE:	Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Soil Sampling
PPE:	Modified Level D
Work Crew Monitoring:	None (use dust suppression techniques)
Health and Safety Operations:	Personal sampling for lead, NIOSH 7082
Task:	Borehole installation/sampling
PPE:	Modified Level D
Work Crew Monitoring:	None (use dust suppression techniques)
Health and Safety Operations:	Personal sampling for lead, NIOSH 7082
Task:	Excavation
PPE:	Based upon monitoring, minimum Modified Level D
Work Crew Monitoring:	Multigas Detector and FID (use dust suppression techniques)
Health and Safety Operations:	Personal sampling for lead, NIOSH 7082

SITE-SPECIFIC SUPPLEMENTARY HEALTH & SAFETY

Continued

AREE 8 UST Leaks and Spills

Materials suspected at this location
Petroleum Products

Materials likely to be found at this location
Petroleum Products

Objective:	Determine the presence of the above contaminants
Task:	Geophysics and Land Surveying
PPE:	Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Surface water sampling
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Sediment sampling
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Soil Sampling (Surface and Subsurface)
PPE:	Modified Level D
Work Crew Monitoring:	FID
Health and Safety Operations:	None
Task:	Borehole Installation/Sampling and Well Installation
PPE:	Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None
Task:	Excavation
PPE:	Based upon monitoring, minimum Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None

SITE-SPECIFIC SUPPLEMENTARY HEALTH & SAFETY

Continued

AREE 8 UST Leaks and Spills

Task:	Groundwater Sampling
PPE:	Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None

Task:	SCAPs
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Task:	Direct Push
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Continued

AREE 11 Oil/Water Separator

Materials suspected at this location

Petroleum products
Solvents
BNAs
PCBs

Materials likely to be found at this location

Petroleum products
VOCs
BNAs
PCBs

Objective:	Determine the presence and mobility of the contaminants above
Task:	Geophysics and Land Surveying
PPE:	Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Soil Sampling
PPE:	Modified Level D
Work Crew Monitoring:	FID (use dust suppression techniques)
Health and Safety Operations:	Personal sampling for BNAs, NIOSH 5506
Task:	Borehole Installation/Sampling and Well Installation
PPE:	Modified Level D
Work Crew Monitoring:	FID (use dust suppression techniques)
Health and Safety Operations:	Personal sampling for BNAs, NIOSH 5506
Task:	Excavation
PPE:	Based upon monitoring, minimum Modified Level D
Work Crew Monitoring:	Multigas Detector and FID (use dust suppression techniques)
Health and Safety Operations:	Personal sampling for BNAs, NIOSH 5506

Continued

AREE 11 Oil/Water Separator (Continued)

Task:	Surface Water Sampling
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Task:	Sediment Sampling
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Task:	Groundwater Sampling
PPE:	Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None

Task:	Direct Push
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Continued

AREE 12 Drum Storage Area

Materials suspected at this location
Petroleum products
Solvents
BNAs

Materials likely to be found at this location
Petroleum products
Solvents
BNAs

Objective: Determine the presence and mobility of the contaminants above

Task: Geophysics and Land Surveying
PPE: Level D
Work Crew Monitoring: None
Health and Safety Operations: None

Task: Soil Sampling
PPE: Modified Level D
Work Crew Monitoring: FID (use dust suppression techniques)
Health and Safety Operations: Personal sampling for BNAs, NIOSH 5506

Task: Borehole Installation/Sampling and Well Installation
PPE: Modified Level D
Work Crew Monitoring: FID (use dust suppression techniques)
Health and Safety Operations: Personal sampling for BNAs, NIOSH 5506

Task: Excavation
PPE: Based upon monitoring, minimum Modified Level D
Work Crew Monitoring: Multigas Detector and FID (use dust suppression techniques)
Health and Safety Operations: Personal sampling for BNAs, NIOSH 5506

Task: Groundwater Sampling
PPE: Modified Level D
Work Crew Monitoring: Multigas Detector and FID
Health and Safety Operations: None

Continued

AREE 12 Drum Storage Area (Continued)

Task:	Direct Push
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Continued

AREE 13 Acid Neutralization Tank

Materials suspected at this location
Acids
Metals (Lead)

Materials likely to be found at this location
Acids
Metals (Lead)

Objective: Determine the presence and mobility of the contaminants above

Task:	Geophysics and Land Surveying
PPE:	Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Task:	Soil Sampling
PPE:	Modified Level D
Work Crew Monitoring:	None (use dust suppression techniques)
Health and Safety Operations:	None

Task:	Borehole installation/sampling
PPE:	Modified Level D
Work Crew Monitoring:	None (use dust suppression techniques)
Health and Safety Operations:	None

Task:	Excavation
PPE:	Based upon monitoring, minimum Modified Level D
Work Crew Monitoring:	Multigas Detector and FID (use dust suppression techniques)
Health and Safety Operations:	None

Task:	Direct Push
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

AREE 14 Oil/Water Separator (Building 211)

Materials suspected at this location

Petroleum products
Solvents
BNAs

Materials likely to be found at this location

Petroleum products
VOCs
BNAs

Objective:	Determine the presence and mobility the contaminants above
Task:	Geophysics and Land Surveying
PPE:	Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Soil Sampling
PPE:	Modified Level D
Work Crew Monitoring:	FID (use dust suppression techniques)
Health and Safety Operations:	Personal sampling for BNAs, NIOSH 5506
Task:	Borehole Installation/Sampling and Well Installation
PPE:	Modified Level D
Work Crew Monitoring:	FID (use dust suppression techniques)
Health and Safety Operations:	Personal sampling for BNAs, NIOSH 5506
Task:	Excavation
PPE:	Based upon monitoring, minimum Modified Level D
Work Crew Monitoring:	Multigas Detector and FID (use dust suppression techniques)
Health and Safety Operations:	Personal sampling for BNAs, NIOSH 5506
Task:	Surface Water Sampling
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Continued

AREE 14 Oil/Water Separator (Building 211)

Task:	Sediment Sampling
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Task:	Groundwater Sampling
PPE:	Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None

Task:	Direct Push
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Continued

AREE 18 Flammable/Battery Storage (Building 204)

Materials suspected at this location

Metals
Solvents
BNAs

Materials likely to be found at this location

Metals
VOCs
BNAs

Objective:	Determine the presence and mobility of the contaminants above
Task:	Geophysics and Land Surveying
PPE:	Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Soil Sampling (Surface and Subsurface)
PPE:	Modified Level D
Work Crew Monitoring:	None (use dust suppression techniques)
Health and Safety Operations:	None
Task:	Borehole Installation/Sampling and Well Installation
PPE:	Modified Level D
Work Crew Monitoring:	FID (use dust suppression techniques)
Health and Safety Operations:	None
Task:	Excavation
PPE:	Based upon monitoring, minimum Modified Level D
Work Crew Monitoring:	Multigas Detector and FID (use dust suppression techniques)
Health and Safety Operations:	None
Task:	Groundwater Sampling
PPE:	Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None

Continued

AREE 18 Flammable/Battery Storage (Building 204) (Continued)

Task:	Direct Push
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Continued

AREE 19 Thermal Battery Storage

Materials suspected at this location
Metals
Materials likely to be found at this location
Metals

Objective:	Determine the presence and mobility of the contaminants above
Task:	Land Surveying
PPE:	Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Soil Sampling (Surface and Subsurface)
PPE:	Modified Level D
Work Crew Monitoring:	None (use dust suppression techniques)
Health and Safety Operations:	None
Task:	Borehole Installation/Sampling and Well Installation
PPE:	Modified Level D
Work Crew Monitoring:	None (use dust suppression techniques)
Health and Safety Operations:	None
Task:	Excavation
PPE:	Base upon monitoring, minimum Modified Level D
Work Crew Monitoring:	Multigas Detector and FID (use dust suppression techniques)
Health and Safety Operations:	None
Task:	Groundwater Sampling
PPE:	Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None
Task:	Direct Push
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Continued

AREE 20 Former Incinerator

Materials suspected at this location	Metals
Materials likely to be found at this location	Metals
Objective:	Determine the presence and mobility of the contaminants above
Task:	Geophysics and Land Surveying
PPE:	Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Surface Soil Sampling
PPE:	Modified Level D
Work Crew Monitoring:	None (use dust suppression techniques)
Health and Safety Operations:	None
Task:	Borehole installation/sampling
PPE:	Modified Level D
Work Crew Monitoring:	None (use dust suppression techniques)
Health and Safety Operations:	None
Task:	Excavation
PPE:	Base upon monitoring, minimum Modified Level D
Work Crew Monitoring:	Multigas Detector and FID (use dust suppression techniques)
Health and Safety Operations:	None

Continued

AREE 21 Former Storage Area

Materials suspected at this location
PCBs
Petroleum Products

Materials likely to be found at this location
PCBs
Petroleum Products

Objective:	Determine the presence and mobility of the contaminants above
Task:	Land Surveying
PPE:	Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Soil Sampling (Surface and Subsurface)
PPE:	Modified Level D
Work Crew Monitoring:	FID (use dust suppression techniques)
Health and Safety Operations:	None
Task:	Borehole Installation/Sampling and Well Installation
PPE:	Modified Level D
Work Crew Monitoring:	FID (use dust suppression techniques)
Health and Safety Operations:	None
Task:	Excavation
PPE:	Based upon monitoring, minimum Modified Level D
Work Crew Monitoring:	Multigas Detector and FID (use dust suppression techniques)
Health and Safety Operations:	None
Task:	Groundwater Sampling
PPE:	Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None

Continued

AREE 21 Former Storage Area (Continued)

Task:	Direct Push
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

AREE 22 Drainage Ditch

Materials suspected at this location	Petroleum Products
Materials likely to be found at this location	Petroleum Products
Objective:	Determine the presence and mobility of the contaminants above
Task:	Land Surveying
PPE:	Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Surface water sampling
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Sediment sampling
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Borehole Installation/Sampling and Well Installation
PPE:	Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None
Task:	Excavation
PPE:	Based upon monitoring, minimum Modified Level D
Work Crew Monitoring:	Multigas Detector and FID (use dust suppression techniques)
Health and Safety Operations:	None
Task:	Groundwater Sampling
PPE:	Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None

Continued

AREE 22 Drainage Ditch (Continued)

Task:	Soil Sampling
PPE:	Modified Level D
Work Crew Monitoring:	FID
Health and Safety Operations:	None

Task:	SCAPs
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Task:	Direct Push
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Continued

AREE 23 Former Underground Storage Tanks

Materials suspected at this location	Petroleum Products
Materials likely to be found at this location	Petroleum Products
Objective:	Determine the presence of the above contaminants
Task:	Geophysics and Land Surveying
PPE:	Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Groundwater Sampling
PPE:	Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None
Task:	Soil Sampling (Surface and Subsurface)
PPE:	Modified Level D
Work Crew Monitoring:	FID
Health and Safety Operations:	None
Task:	Borehole Installation/Sampling and Well Installation
PPE:	Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None
Task:	Excavation
PPE:	Based upon monitoring, minimum Modified Level D
Work Crew Monitoring:	Multigas Detector and FID
Health and Safety Operations:	None
Task:	Surface Water Sampling
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Continued

AREE 23 Former Underground Storage Tanks (Continued)

Task:	SCAPs
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Task:	Sediment Sampling
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Task:	Direct Push
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Continued

AREE 25 Sewage Injection Area

Materials suspected at this location
Metals

Materials likely to be found at this location
Metals

Objective:	Determine the presence and mobility of the metals
Task:	Land Surveying
PPE:	Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Soil Sampling (Surface and Subsurface)
PPE:	Modified Level D
Work Crew Monitoring:	None (use dust suppression techniques)
Health and Safety Operations:	None
Task:	Borehole installation/sampling
PPE:	Modified Level D
Work Crew Monitoring:	None (use dust suppression techniques)
Health and Safety Operations:	None
Task:	Excavation
PPE:	Based upon monitoring, minimum Modified Level D
Work Crew Monitoring:	Multigas Detector and FID (use dust suppression techniques)
Health and Safety Operations:	None
Task:	Direct Push
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Continued

AREE 26 Buried Antifreeze in Hoses

Materials suspected at this location
Ethylene glycol

Materials likely to be found at this location
Ethylene glycol

Objective: Determine the presence and mobility of ethylene glycol

Task:	Geophysics and Land Surveying
PPE:	Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Task:	Soil Sampling
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Task:	Borehole installation/sampling
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

Task:	Excavation
PPE:	Based upon monitoring, minimum Modified Level D
Work Crew Monitoring:	Multigas Detector and FID (use dust suppression techniques)
Health and Safety Operations:	None

Task:	Direct Push
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

SITE-SPECIFIC SUPPLEMENTARY HEALTH & SAFETY

Continued

AREE 27 Buried Wire

Materials suspected at this location
Lead
PCBs

Materials likely to be found at this location
Metals

Objective:	Determine the presence and mobility of the metals
Task:	Geophysics and Land Surveying
PPE:	Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None
Task:	Soil Sampling (Surface and Subsurface)
PPE:	Modified Level D
Work Crew Monitoring:	None (use dust suppression techniques)
Health and Safety Operations:	None
Task:	Borehole installation/sampling
PPE:	Modified Level D
Work Crew Monitoring:	None (use dust suppression techniques)
Health and Safety Operations:	None
Task:	Excavation
PPE:	Based upon monitoring, minimum Modified Level D
Work Crew Monitoring:	Multigas Detector and FID (use dust suppression techniques)
Health and Safety Operations:	None
Task:	Direct Push
PPE:	Modified Level D
Work Crew Monitoring:	None
Health and Safety Operations:	None

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APPENDIX B
HAZARDOUS AND TOXIC MATERIALS

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TOXIC AND HAZARDOUS MATERIALS

Aluminum

Aluminum is a metallic element, usually found as the oxide. Aluminum and aluminum oxide (alumina) are virtually nontoxic and are treated as nuisance particulates. Powdered aluminum is used as a fuel in solid rocket propellant formulations.

Asbestos

Asbestos describes a group of related mineral fibers which have been widely used in insulation, fire-proofing and other construction materials due to their unique properties. Asbestos presents primarily an inhalation hazard, which is present whenever asbestos fibers are released to the air. Material capable of releasing fibers under normal, unstressed conditions is referred to as "friable". Asbestos has been demonstrated to cause a number of pulmonary diseases, including asbestosis. It is also regulated by OSHA as a human carcinogen, responsible for development of mesothelioma. Protection against airborne asbestos fibers is easily provided using respirators equipped with HEPA cartridges.

Benzene

Benzene is a colorless, non-polar, flammable liquid with an odor characteristic of aromatic hydrocarbon. Benzene is an OSHA regulated carcinogen. Inhalation or skin contact may produce leukemia and bone marrow depression. Acute exposures may cause depression of central nervous system. Benzene was a performance-boosting additive in aviation gasolines and is often present in petroleum fuels.

Bis(2-ethylhexyl)phthalate

Bis(2-ethylhexyl)phthalate, also known as di(2-ethylhexyl)phthalate, di-sec-octyl phthalate, dioctylphthalate and DOP, is a light colored, odorless liquid. It is commonly used as a plasticizer in many resins and elastomers. Dioctyl phthalate is practically nontoxic and although generally regarded as safe, recent animal studies show increased incidence of cancer. This and other phthalate esters are used in plastics to increase flexibility.

Carbon Tetrachloride

Carbon tetrachloride is a clear, colorless, nonflammable liquid with a sweetish, distinctive odor. Toxic by inhalation, skin absorption, and ingestion, it may produce anesthesia, cardiac sensitization, and damage to liver and kidneys. Carbon tetrachloride is defatting to the skin and prolonged or repeated application may cause dermatitis. It is highly toxic and extremely dangerous when combined with alcohol exposure or consumption. Carbon tetrachloride was used as an industrial solvent and a fire extinguishant. Exposure to heat or fire may produce phosgene, a highly toxic gas. Carbon tetrachloride is known to the

State of California to cause cancer. Exposure to carbon tetrachloride may cause liver cancer.

Chromates

Chromates, the chromium salts of metals, are used as pigments, corrosion inhibitors, and to tan leather. The chromates of divalent metals, including lead, zinc, and cadmium, have been found to be carcinogenic. The chromium in chromate compounds is in the hexavalent valence state. Hexavalent chromium is a strong oxidizer and corrosive to tissue. Exposure to airborne chromates may produce nasal ulcers and perforated nasal septa.

Chromium

Chromium is a metallic element. Chromium compounds are used as pigments, corrosion inhibitors, in tanning leather, and to produce decorative finish. Many hexavalent chromium compounds have been found to be carcinogenic. Hexavalent chromium is a strong oxidizer and corrosive to tissue. Exposure to airborne hexavalent chromium compounds may produce nasal ulcers and perforated nasal septa.

Coal Tar

Coal tar is a heavy black material derived from coal and used to make roofing felts, roofing mastics, and roofing patch material. It contains polynuclear aromatic hydrocarbons, some of which produce photosensitization when inhaled. Photosensitization may cause dermatitis on exposed areas where sunlight strikes the skin. Coal tar may also contain cancer-causing polynuclear aromatic hydrocarbons, such as benzo(a)pyrene.

Copper

Copper is a soft, reddish, ductile metal. Inhalation of copper dust and copper compounds may produce congestion of the nasal mucous membranes and ulceration. Ingestion may produce gastroenteritis, stomach pain and diarrhea. The main use of copper is electrical wire.

Diesel Fuel

Diesel fuel is a middle petroleum distillate liquid, slightly less dense than water with a distinctive odor. As a fuel for compression ignition engines, it is designated number 1 or number 2 fuel oil with colors ranging from colorless to dark brown. Diesel fuel is combustible with a flash point of 110° - 190°F, consisting mainly of unbranched paraffins. Diesel may contain toxic additives to improve its storage and performance as a motor fuel.

Diesel presents a toxic hazard by skin absorption and ingestion. Prolonged contact with the liquid may cause dermatitis. Inhalation of the vapors may depress the central nervous system, increasing reaction times, and decreasing pulse rate and blood pressure. It is a fat solvent which accounts for its skin irritating property. Additives to improve performance as a motor fuel may increase toxicity, especially if the material is sprayed into the air as a mist. Glycol ethers, such as ethylene glycol monomethyl ether, may be added to diesel fuel to promote compatibility with water. High concentrations of glycol ethers may be concentrated in the bottom water in fuel storage tanks where water has separated from the fuel.

Ethylbenzene

Ethylbenzene is a colorless, flammable liquid with an aromatic odor. Ethylbenzene is an irritant to the skin and mucous membranes. Inhalation may produce depression of the central nervous system. Ethylbenzene was a performance-boosting additive in aviation gasolines and is often present in petroleum fuels.

Ethylene Glycol

Ethylene glycol is a clear, colorless, syrupy liquid. It has a sweetish taste and is practically odorless. It is toxic by inhalation and ingestion. Its major metabolite, oxalic acid, is toxic to the kidneys.

Gasoline (motor fuel)

Gasoline consists mainly of branched alkanes with four to nine carbon atoms, cycloparaffins and aromatic hydrocarbons. Gasoline contains the OSHA-regulated carcinogen benzene and may contain toxic antiknock compounds such as tetraethyl lead, tetramethyl lead, methyl t-butyl ether (MTBE) and tricresyl phosphate (TCP). The alkyl leads, tetraethyl lead and tetramethyl lead, are extremely hazardous because they are very toxic to the nervous system and are readily absorbed through intact skin. MTBE is also quite toxic and is absorbed through intact skin. Glycol ethers, such as ethylene glycol monomethyl ether, may be added to gasoline to promote compatibility with water. High concentrations of glycol ethers may be concentrated in the bottom water in gasoline storage tanks where water has separated from the gasoline. Inhalation of gasoline vapor can cause depression of the central nervous system with symptoms such as headache, dizziness, nausea, and loss of coordination. Skin contact with liquid gasoline can cause defatting of the skin, skin irritation and dermatitis. Benzene, a known human carcinogen, comprises 1-5 percent of modern gasolines and was present in much higher concentrations in gasolines blended before 1970. Exposure to

benzene may cause depression of the blood forming bone marrow and may cause leukemia, a cancer of the white blood cells. Gasoline presents a toxic hazard by inhalation, skin absorption and ingestion. Gasoline is highly volatile and extremely flammable.

Hydrogen Sulfide

Hydrogen sulfide is a colorless gas with the characteristic odor of rotten eggs. It is irritating to eyes and mucous membranes and toxic to all organ systems. The sense of smell is easily fatigued by hydrogen sulfide, and therefore, the odor cannot be depended upon to give fair warning. This highly flammable gas may also present a dangerous fire risk. It is a rapid acting poison, producing death by respiratory arrest. Hydrogen sulfide may be released from sludges and sediments when they are disturbed.

Lead

Lead is a heavy, ductile, soft, gray metal. Lead and its compounds are toxic by inhalation and ingestion. Lead has been identified as a reproductive toxin. Chronic exposures may produce reduced mental capacity, reduced nerve conduction velocities, constipation, wrist drop and ankle drop. Lead is used extensively in electrical soldering alloys, electrical storage batteries, and in the past, weather-resistant paints.

Methylene chloride

Methylene chloride is a clear, colorless, volatile liquid with a penetrating, ether-like odor. Also known as dichloromethane, it is metabolized to produce carboxyhemoglobin. Methylene chloride is toxic by inhalation and skin absorption, producing central nervous system depression, carboxyhemoglobin, and liver disease. Methylene chloride is not flammable. Methylene chloride is a good (aggressive) industrial solvent with many uses.

Methyl Ethyl Ketone (2-Butanone)

Methyl ethyl ketone is a clear, colorless volatile liquid with an acetone-like pleasant, sweet odor. The odor threshold ranges from 5 to 10 ppm. Methyl ethyl ketone is extremely flammable. Acute exposures depress the central nervous system producing lassitude, mental dullness and digestive disturbances. Methyl ethyl ketone finds many uses as an industrial solvent and in paints.

4-Methyl-2-pentanone (Methyl isobutyl ketone)

4-Methyl-2-pentanone, commonly known as methyl isobutyl ketone (MIBK), is a clear liquid with a characteristic sweet, sharp odor. At high concentrations methyl isobutyl ketone is irritating to the eyes and mucous membranes. It is highly narcotic, depressing the central nervous system and mildly toxic to the liver and kidneys. Methyl isobutyl ketone is flammable. Methyl ethyl ketone finds many uses as an industrial solvent and in paints.

Nickel

Nickel is a lustrous, hard, white metal. Nickel and its compounds may produce allergic hypersensitization by inhalation, skin contact, or ingestion in some individuals, but is otherwise not very toxic. Nickel is a potential carcinogen. Nickel is used in alloys to improve temperature performance and as a corrosion-resistant coating.

Polychlorinated Biphenyls

Repeated or prolonged contact leads to chloracne. Chloracne PCB exposure can cause liver damage and jaundice. Some PCBs are carcinogenic.

Perchloroethylene

Perchloroethylene is a nonflammable, colorless liquid with an ether-like odor. Synonyms include tetrachloroethylene, and tetrachloroethene. Inhalation, ingestion, and skin contact may cause depression of the central nervous system with dizziness, drowsiness, headache, and vertigo. Chronic exposures may cause damage to the liver. Perchloroethylene is used as an industrial solvent.

Petroleum Oil

Petroleum oils are mixtures of aliphatic, olefinic and aromatic hydrocarbons used as lubricants and antioxidants. Though liquid at room temperature, petroleum oils may oxidize to become more viscous, gummy or even solid. Petroleum oils are low to moderately toxic by ingestion or inhalation of mist.

Phosphoric Acid

Phosphoric acid is a strong mineral acid, corrosive to all flesh. Chronic exposures may cause tooth erosion, gastritis, and stomach ulcers. Phosphoric acid is toxic by inhalation and irritating to eyes and mucous membranes.

Base-Neutral and Acid Extractable Compounds (BNA)
a.k.a.: Polynuclear Aromatic Hydrocarbons (PAHs)
Anthracene
Anthrene
Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(g,h,i)perylene
Benzo(d,e,f)phenanthrene
Benzo(a)pyrene
Chrysene
Fluoranthene
Fluorene
Indeno(1,2,3-c,d)pyrene
Phenanthrene

These are polynuclear aromatic hydrocarbons and in the pure state are yellowish crystalline solids. These chemicals are found in coal tar and in products of incomplete combustion. These chemicals have varying degrees of potency for causing cancer, with benzo(a)pyrene being among the most potent. PAHs may cause photo-sensitization and a rash where sunlight strikes the skin. Exposure may also cause cancer of lungs, skin, bladder or kidneys. Benzo(b)fluoranthene, benzo(j)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, and indeno(1,2,3,c,d)pyrene have been identified as carcinogenic. Polynuclear aromatic compounds are formed when petroleum fuels are burned in a smokey flame.

Pyrene

Pyrene is also known as benzo(d,e,f)phenanthrene, please see **Polynuclear Aromatic Hydrocarbons** above. Pyrene is a colorless to yellow solid and a carcinogen.

Silica

Silica is a crystalline solid form of silicon dioxide. In the crystalline form of α-quartz, respirable sized particles when inhaled may cause pulmonary fibrosis. Sand is composed mostly of α-quartz.

Sulfuric Acid

Sulfuric acid is a strong mineral acid, corrosive to all flesh. Chronic exposures may cause tooth erosion, gastritis, and stomach ulcers. Sulfuric acid is toxic by inhalation and irritating to eyes and mucous membranes. Inhalation of vapor from hot, concentrated acid

may injure lungs. Swallowing may cause severe injury or death. Contact with skin or eyes causes severe burns.

Toluene

Toluene is a clear, colorless, flammable liquid with a typical aromatic odor. Inhalation may depress the central nervous system, increasing reaction times, and decreasing pulse rate and blood pressure. Toluene is a constituent in middle petroleum distillates, such as RP-1, and is used as an industrial solvent.

1,1,1-Trichloroethane

1,1,1-Trichloroethane, also known as methyl chloroform, is a clear, colorless, nonflammable liquid with a mild ether-like odor. Inhalation may produce anesthesia, cardiac sensitization, and damage to liver and kidneys. Methyl chloroform is defatting to the skin and prolonged or repeated application may cause dermatitis. It has relatively low toxicity. 1,1,1-Trichloroethane is used as an industrial solvent.

Trichloroethylene

Trichloroethylene is a clear, colorless, nonflammable liquid with a mild ether-like odor. Inhalation may produce anesthesia, cardiac sensitization, and damage to liver and kidneys. Also known as TCE Methyl, it is defatting to the skin and prolonged or repeated application may cause dermatitis. It has moderate toxicity and was used as an industrial solvent until replaced by methyl chloroform.

Waste Lubricating Oil

Lubricating oils for modern high performance engines contain many toxic additives. In waste oil, most of the additives are depleted, but the oil may contain metals from engine wear and polynuclear aromatic hydrocarbons from thermal breakdown of the oil. Lubricating oils are toxic by way of ingestion and possibly by skin absorption. Prolonged contact with waste lubricating oils may cause skin irritation and dermatitis. Waste lubricating oils are potential human carcinogens. Waste Oil is identified as a carcinogen under California's Proposition 65.

Xylene

Xylene is a clear, colorless, flammable liquid with a mildly disagreeable odor. Also known as dimethyl benzene, xylene has three isomers, ortho, meta and para. These are often lumped together and referred to as *xylenes*. Inhalation may produce headache, fatigue,

lassitude, irritability, nausea, anorexia, and flatulence. Xylene is a constituent in middle petroleum distillates, such as RP-1, and is used as an industrial solvent.

Zinc

Zinc is a bright, white metal with a blue-gray luster. Metallic zinc dust and zinc oxide dust have relatively low toxicity. Inhalation of zinc fume may produce flu-like symptoms. Zinc is used in die cast parts and as a corrosion-protective coating.

APPENDIX C
EXPOSURE GUIDELINES

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EXPOSURE GUIDELINES

Substance	OSHA PEL[1]	OSHA STEL[2]	ACGIH TLV[3]	ACGIH STEL[4]	TETC OEL[5]
Aluminum	15 mg/m³ total 5 mg/m³ respirable	NE	10 mg/m³	NE	10 mg/m³
Benzene	1 ppm	5 ppm	10 ppm A2[8]	NE	See OSHA
Benzo(a)anthracene	NE	NE	NE	NE	0.2 mg/m³
Benzo(b)fluoranthene	NE	NE	A2[8]	NE	0.2 mg/m³
Benzo(k)fluoranthene	NE	NE	NE	NE	0.2 mg/m³
Benzo(g,h,i)perylene	NE	NE	NE	NE	0.2 mg/m³
Benzo(d,e,f) phenanthrene	NE	NE	NE	NE	0.2 mg/m³ IARC 2B
Benzo(a)pyrene	0.2 mg/m³	NE	A2[8]	NE	0.2 mg/m³
Bis(2-ethylhexyl) phthalate	5 mg/m³	10 mg/m³	5 mg/m³	10 mg/m³	See OSHA
2-Butanone (methyl ethyl ketone)	200 ppm	300 ppm	200 ppm	300 ppm	See OSHA
Carbon tetrachloride	2 ppm	NE	5 ppm A2[8] skin	NE	2 ppm/60 min Ca skin
Chromium	NE	0.1 mg/m³	0.05 mg/m³	NE	See OSHA
Chrysene	NE	NE	NE	NE	0.2 mg/m³
Coal Tar Pitch Volatiles	0.2 mg/m³	NE	0.2 mg/m³ A1[7]	NE	See OSHA
Di-n-Octylphthalate	NE	NE	NE	NE	5 mg/m³
Diesel fuel	NE	NE	NE	NE	2 mg/m³ mist
Ethyl benzene	100 ppm	125 ppm	100 ppm	125 ppm	See OSHA
Ethylene glycol	--	50 ppm ceiling	--	50 ppm ceiling	See OSHA

EXPOSURE GUIDELINES

Continued

Substance	OSHA PEL[1]	OSHA STEL[2]	ACGIH TLV[3]	ACGIH STEL[4]	TETC OEL[5]
Fluoranthene	NE	NE	NE	NE	0.2 mg/m^3
Fluorene	NE	NE	NE	NE	0.2 mg/m^3
Gasoline	300 ppm	500 ppm	300 ppm	500 ppm	See OSHA
Hydrogen sulfide	10 ppm	15 ppm	10 ppm	15 ppm	See OSHA
Indeno(1,2,3-c,d) pyrene	NE	NE	NE	NE	0.2 mg/m^3 IARC 2B NTP-2
Methylene chloride (dichloromethane)	500 ppm	1000 ppm	50 ppm A2[8]	NE	25 ppm
4-Methyl-2-pentanone (methyl isobutyl ketone)	50 ppm	75 ppm	50 ppm	75 ppm	50 ppm
Nickel soluble compounds	0.1 mg/m^3	NE	0.05 mg/m^3 A1[7]	NE	0.05 mg/m^3
Perchloroethylene	25 ppm	NE	50 ppm	200 ppm	See OSHA
Petroleum distillates (Petroleum hydrocarbons)	400 ppm	NE	NE	NE	See note 7.
Phenanthrene	NE	NE	NE	NE	0.2 mg/m^3
Polychlorinated biphenyl (42% chlorine)	1 mg/m^3	NE	1 mg/m^3	NE	1 μg/m^3
Polychlorinated biphenyl (54% chlorine)	0.5 mg/m^3	NE	0.5 mg/m^3	NE	1 μg/m^3
Pyrene	NE	NE	NE	NE	0.2 mg/m^3
Silica, as α-quartz	0.1 mg/m^3	NE	0.1 mg/m^3	NE	See OSHA
Sulfuric acid	1 mg/m^3	NE	1 mg/m^3	3 mg/m^3	See ACGIH
Tetrachloroethene (Perchloroethylene)	25 ppm	NE	50 ppm	200 ppm	See OSHA
Toluene	100 ppm	150 ppm	50 ppm	NE	See OSHA

EXPOSURE GUIDELINES

Continued

Substance	OSHA PEL[1]	OSHA STEL[2]	ACGIH TLV[3]	ACGIH STEL[4]	TETC OEL[5]
1,1,1-Trichloroethane (Methyl chloroform)	350 ppm	450 ppm	350 ppm	450 ppm	See OSHA
Trichloroethylene	50 ppm	200 ppm	50 ppm	200 ppm	See OSHA
Xylene	100 ppm	150 ppm	100 ppm	150 ppm	See OSHA
Zinc —	10 mg/m^3	NE	10 mg/m^3	NE	5 mg/m^3

Notes:

1. United States Department of Labor, Occupational Safety and Health Administration (USDOL/OSHA) publishes the permissible exposure limit (PEL) in Title 29 of the Code of Federal Regulations, Part 1910.1000 (29 CFR 1910.1000.) The PELs represent 8-hour time weighted average exposures.

2. The USDOL/OSHA short term exposure limits (STEL) allow for one 15 minute exposure once a day to exceed the PEL, but not the STEL.

3. The American Conference of Governmental Industrial Hygienists (ACGIH) provides guidance to protect from chemical exposures through the threshold limit values. Threshold Limit Value and TLV are registered trademarks of the ACGIH.

4. The American Conference of Governmental Industrial Hygienists (ACGIH) Short Term Exposure Limit (STEL) is defined as a 15-minute time weighted average exposure which should not be exceeded at any time during a workday even if the 8-hour time weighted average is within the TLV. Exposures above the TLV should not be longer than 15 minutes and should not occur more than 4 times per day. There should be at least 60 minutes between each successive exposure in this range. An averaging period other than 15 minutes may be recommended when this is warranted by observed health effects.

5. The Earth Technology Corporation sets occupational exposure limits (OEL) to protect its employees from unusual chemical exposures. The Earth Technology OELs are based on information available in the open literature, governmental reports, including NIOSH recommended exposure limits (RELs), and good industrial hygiene practice.

6. Occupational exposure limit (OEL) for petroleum distillates depends on the constituents of the mixture.

7. A1 - *Confirmed Human Carcinogen*: The agent is carcinogenic to humans based on the weight of evidence from epidemiologic studies of, or convincing clinical evidence in, exposed humans.

8. A2 - *Suspected Human Carcinogen*: The agent is carcinogenic in experimental animals at dose levels, by routes of administration, at sites, of histologic types, or by mechanisms that are considered relevant to worker exposure. Available epidemiologic studies are conflicting or insufficient to confirm an increased risk of cancer in exposed humans.

9. A3 - *Animal Carcinogen*: The agent is carcinogenic in experimental animals at a relatively high dose, by routes of administration, at sites, of histologic types, or by mechanisms that are not considered relevant to worker exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans except under uncommon or unlikely routes or levels of exposure.

10. A4 - *Not Classifiable as a Human Carcinogen*: There are inadequate data on which to classify the agent in terms of its carcinogenicity.

ABBREVIATIONS AND ACRONYMS USED IN THIS SECTION

ACGIH:	American Conference of Governmental Industrial Hygienists
Ca:	Carcinogen
IARC:	United Nations International Agency for Research on Cancer
NE:	Not established
NCI:	National Cancer Institute
NTP:	National Toxicology Program
OSHA:	Occupational Safety and Health Administration
PEL:	Permissible Exposure Limit (8 hour time-weighted average) (OSHA)
STEL:	Short Term Exposure Limit (15 minute average)
TLV:	Threshold Limit Value (8 hour time-weighted average) (ACGIH)

APPENDIX D
HEALTH AND SAFETY FORMS

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CODE OF SAFE PRACTICES

GENERAL

1. All persons shall follow these safe practices rules, render every possible aid to safe operations, and report all unsafe conditions or practices to the foreman or superintendent.

2. Foremen shall insist on employees observing and obeying every rule, regulation, and order as is necessary to the safe conduct of the work, and shall take such action as is necessary to obtain observance.

3. All employees shall be given frequent accident prevention instructions. Instructions shall be given at least every 10 working days.

4. Anyone known to be under the influence of drugs or intoxicating substances which impair the employee's ability to safely perform the assigned duties shall not be allowed on the job while in that condition.

5. Horseplay, scuffling, and other acts which tend to have an adverse influence on the safety or well-being of the employees shall be prohibited.

6. Work shall be well planned and supervised to prevent injuries in the handling of materials and in working together with equipment.

7. No one shall knowingly be permitted or required to work while the employee's ability or alertness is so impaired by fatigue, illness, or other causes that it might unnecessarily expose the employee or others to injury.

8. Employees shall not enter manholes, underground vaults, chambers, tanks, silos, or other similar places that receive little ventilation, unless it has been determined that it is safe to enter.

9. Employees shall be instructed to ensure that all guards and other protective devices are in proper places and adjusted, and shall report deficiencies promptly to the foreman or superintendent.

10. Crowding or pushing when boarding or leaving any vehicle or other conveyance shall be prohibited.

11. Workers shall not handle or tamper with any electrical equipment, machinery, or air or water lines in a manner not within the scope of their duties, unless they have received instructions from their foreman.

12. All injuries shall be reported promptly to the foreman or superintendent so that arrangements can be made for medical or first aid treatment.

13. When lifting heavy objects, the large muscles of the leg instead of the smaller muscles of the back shall be used.

14. Inappropriate footwear or shoes with thin or badly worn soles shall not be worn.

15. Materials, tools, or other objects shall not be thrown from buildings or structures until proper precautions are taken to protect others from the falling objects.

16. Employees shall cleanse thoroughly after handling hazardous substances, and follow special instructions from authorized sources.

17. Hod carriers should avoid the use of extension ladders when carrying loads. Such ladders may provide adequate strength, but the rung position and rope arrangement make such climbing difficult and hazardous for this trade.

18. Work shall be so arranged that employees are able to face ladder and use both hands while climbing.

19. Gasoline shall not be used for cleaning purposes.

20. No burning, welding, or other source of ignition shall be applied to any enclosed tank or vessel, even if there are some openings, until it has first been determined that no possibility of explosion exists, and authority for the work is obtained from the foreman or superintendent.

21. Any damage to scaffolds, falsework, or other supporting structures shall be immediately reported to the foreman and repaired before use.

A RULE BREAKER IS AN ACCIDENT MAKER

USE OF TOOLS AND EQUIPMENT

22. All tools and equipment shall be maintained in good condition.

23. Damaged tools or equipment shall be removed from service and tagged "DEFECTIVE."

24. Pipe or Stillson wrenches shall not be used as a substitute for other wrenches.

25. Only appropriate tools shall be used for the job.

26. Wrenches shall not be altered by the addition of handle-extensions or "cheaters."

27. Files shall be equipped with handles and not used to punch or pry.

28. A screwdriver shall not be used as a chisel.

29. Wheelbarrows shall not be pushed with handles in an upright position.

30. Portable electric tools shall not be lifted or lowered by means of the power cord. Ropes shall be used.

31. Electric cords shall not be exposed to damage from vehicles.

32. In locations where the use of a portable power tool is difficult, the tool shall be supported by means of a rope or similar support of adequate strength.

MACHINERY AND VEHICLES

33. Only authorized persons shall operate machinery or equipment.

34. Loose or frayed clothing, or long hair, dangling ties, finger rings, etc., shall not be worn around moving machinery or other sources of entanglement.

35. Machinery shall not be serviced, repaired or adjusted while in operation, nor shall oiling of moving parts be attempted, except on equipment that is designed or fitted with safeguards to protect the person performing the work.

36. Where appropriate, lock-out procedures shall be used.

37. Employees shall not work under vehicles supported by jacks or chain hoists, without protective blocking that will prevent injury if jacks or hoists should fail.

38. Air hoses shall not be disconnected at compressors until hose line has been bled.

39. All excavations shall be visually inspected before backfilling, to ensure that it is safe to backfill.

40. Excavating equipment shall not be operated near tops of cuts, banks, and cliffs if employees are working below.

41. Tractors, bulldozers, scrapers and carryalls shall not operate where there is possibility of overturning in dangerous areas like edges of deep fills, cut banks, and steep slopes.

42. When loading where there is a probability of dangerous slides or movement of material, the wheels or treads of loading equipment, other than that riding on rails, should be turned in the direction which will facilitate escape in case of danger, except in a situation where this position of the wheels or treads would cause a greater operational hazard.

The Earth Technology Corporation

Injury Report

This is an official document to be initiated by the employee's supervisor. Please answer all questions completely.
This report must be forwarded to the Health and Safety office within 24 hours of the injury.

Injured's name _____ Sex _____ S.S. No. _____ Birthdate _____

Home address _____ City _____ State _____ Zip _____ Phone _____

Job title _____ Employee's section _____ Hire date _____ Hourly wage _____

Supervisor

Date of incident _____ Time _____ Time reported _____ To Whom? _____

Client name _____ Client address _____ Time shift began _____

Exact location of incident _____ Did employee leave work? ☐ No ☐ Yes When _____

Has employee returned to work? ☐ No ☐ Yes When _____ Did employee miss a regularly scheduled shift? ☐ No ☐ Yes

Doctor/Hospital name _____ Address _____

Witness name(s) _____ Statements attached? ☐ No ☐ Yes

Nature of injury _____ Exact body part _____

Medical attention: _____

Job assignment at time of accident _____

Describe incident _____

What caused the accident? _____

What corrective action has been taken to prevent recurrence? _____

Supervisor/Foreman _____ (Print) _____ Signature _____ Date

Manager

Comments on incident and corrective action _____

Manager's name _____ (Print) _____ Signature _____ Date

Health & Safety

Concur with action taken? ☐ No ☐ Yes Remarks _____

OSHA Classification:

☐ Incident only ☐ First aid ☐ No lost workdays ☐ Lost workdays ☐ Restricted activity ☐ Fatality

Days away from work _____ Days restricted work _____ Total days charged _____

Name _____ (Print) _____ Signature _____ Date

The Earth Technology Corporation

Accident / Injury Investigation

Must be completed within 72 hours

1. Date _____ Section _____ Date of Accident / Injury _____

   Employee Name _____

   Supervisor Name _____

   Job Number / Name _____

   Location of Accident / Injury _____

2. Accident / Injury Classification

   Injury
   - ☐ Near Miss
   - ☐ First Aid
   - ☐ OSHA Recordable
   - ☐ Lost Workday

   Vehicle
   - ☐ Chargeable
   - ☐ Non-Chargeable
   - ☐ Not at Fault

   DOT
   - ☐ DOT Vehicle
   - ☐ DOT Reportable

   General Liability ☐

3. Description (Provide facts, describe how incident occurred, provide diagram (on back) or photos)

4. Analysis 1 (What unsafe acts or conditions contributed to the incident?)

5. Analysis 2 (What systematic or management deficiencies contributed to incident?)

6. Corrective action(s) (List corrective action items, responsible person, scheduled completion date)

7. Witnesses (Attach statements or indicate why unavailable)

8. Investigated by _____ (Print Name) _____ (Signature) _____ (Date)

   Manager _____ (Print Name) _____ (Signature) _____ (Date)

   (Attach additional pages if needed)

The Earth Technology Corporation

Accident Review Board

Part I

Date of Board _____ Location _____

Board Member _____ Board Member _____

Board Member _____ Board Member _____

Part II

Accident Date _____ Type _____

Report Complete: ☐ Yes ☐ No Investigation Complete: ☐ Yes ☐ No

Employee Name _____ Employee Signature _____

Employee Name _____ Employee Signature _____

Supervisor Name _____ Supervisor Signature _____

Supervisor Name _____ Supervisor Signature _____

Cause of Accident _____

_____

_____

Action by Board _____

_____

_____

Part III

ACCEPTED ACCEPTED

Employee Name _____ Supervisor Signature _____

APPROVED

HS Manager _____ REJECTED FOR _____

APPROVED

Section Manager _____ REJECTED FOR _____

APPROVED

Division Manager _____ REJECTED FOR _____

The Earth Technology Corporation

Confined Space Entry Permit

Date _____

Job Number _____

Page _____ of _____

Section: _____ Section Location: _____

Client: _____ Client Address: _____

General Job Location: _____ Tank or Vessel No./Name: _____

Describe Material in Space: _____

Description of Work Planned: _____ Chemicals Introduced into Space: _____

Tests

TIME	PERCENT LOWER EXPLOSION LIMIT	PERCENT OXYGEN	BENZENE (ppm)	TOLUENE (ppm)	XYLENE (ppm)	H_2S (ppm)	CO (ppm)	OTHERS _____ (ppm)	OTHERS _____ (ppm)	OTHERS _____ (ppm)	ATMOSPHERE CLASS	INITIALS

Check List

	Initial: Yes	Initial: Does Not Apply
All lines leading to and from confined space have been blinded or disconnected		
Electrical service disconnected or locked out		
All grounding and bonding cables in place		
All lighting, fittings and extension cords are approved explosion proof equipment		
Ground Fault Circuit Interrupter (GFCI) checked and functioning		
All ignition sources have been isolated		
Breathing supply and alarms checked and are in proper condition		
The complete respiratory supply system has been checked and in proper condition		
All safety harnesses and life lines checked and in proper condition		
Required protective clothing, gloves, boots, etc., being used		
Employees have been trained in the use, care and limitations of their respiratory protective equipment		
Attendant (Outside safety watch) trained in emergency procedures and resuscitation		
Vessel contains leaded product		
All emergency systems such as air packs, fire extinguishers, backup breathing supply, alarms, etc. ready for use		
Special warning/caution signs posted		
Ventilation equipment in use		
No employee with facial hair, eye glasses, or other gas tight seal obstructions will do work which requires a respirator, or act as emergency standby		
Employees will not wear contact lenses in an atmosphere where a respirator is required		

PERSONNEL PROTECTIVE EQUIPMENT

EYES
- ☐ Chemical Goggles
- ☐ Face Shield
- ☐ Safety Glasses

EXTREMITIES
- ☐ Hard Hat
- ☐ Gloves
- ☐ Boots ☐ PVC ☐ Neoprene
- ☐ Hoods ☐ PVC ☐ Neoprene
- ☐ Foot Coverings, Disposable
  - ☐ Latex ☐ White Tyvek

BODY
- ☐ Encapsulating Suit
- ☐ Heavy Suit ☐ PVC ☐ Neoprene
- ☐ Intermediate Suit ☐ PVC ☐ Other
- ☐ Light Suit ☐ PVC ☐ Other
- ☐ Tyvek Suit ☐ White ☐ Yellow ☐ Xxx

RESPIRATORY
- ☐ Self-Contained Respirator
- ☐ Air-Line Respirator
- ☐ Air Line w/Egress
- ☐ Cartridge Respirator
  Cartridge Type _____

OTHER
- ☐ Hearing Protection (Top Entry)
- ☐ Parachute Harness, Lifeline, and Lifting Device
- ☐ Chest Harness and Lifeline
- ☐ Communication Equipment
- ☐ Lighting

Special Instructions: _____

ıtry Supervisor _____ _____ _____

Name Printed Signature Date

CONTINUED ON REVERSE

_____ _____

Manager Date

H&S C3A 1/4/93

Diagram the confined space. Indicate the location of manways and ventilators. Indicate the locations where tests were conducted.

View From Top (Indicate North)	View From Side
—) (— Manways (∞) Ventilator	X Test Location

This log of inspections and tests for permit to enter a confined space is applicable and valid **only for one shift on the date shown and only for the employees designated below.**

Employees Assigned (Print names)

_____

_____

_____

_____

_____

_____

_____

_____

Standby Person(s) Assigned (Print names)

_____

_____

_____

Entry Supervisor(s) (Print names)

_____

_____

_____

Project Supervisor _____ _____ _____

Name Printed Signature Date

SEE FRONT

H&S 038 1/4/93

Reference: 29 CFR 1910.146 Permit required confined spaces, and 8CCR5156-5159, Confined Space Entry.

The Earth Technology Corporation

Distrubution:

Safety Inspection Report

Part I

Audited by: _____ Date: _____

Client name: _____ Time from: _____ To: _____

Project No.: _____ Location: _____

Project manager: _____ Supervisor: _____

Foreman: _____ Leadman: _____

Describe job activities: _____

_____

_____

Safety equipment in place: _____

_____

_____

_____

Part II

Item number 1. Safety contact employee (print name) _____

a. Safety issue: _____

_____

_____

b. Recommendation: _____

_____

_____

c. Assigned to: _____ Follow up date: _____

d. Correction verified: _____ Date: _____

Part III

Health and Safety review: _____

Health and Safety reviewer: _____ Date: _____

H&S 06A 1/4/93

The Earth Technology Corporation

Safety Inspection Report
(Continuation)

Item number _____ Safety contact employee (print name) _____

a. Safety issue: _____

b. Recommendation: _____

c. Assigned to: _____ Follow up date: _____

d. Correction verified: _____ Date: _____

Item number _____ Safety contact employee (print name) _____

a. Safety issue: _____

b. Recommendation: _____

c. Assigned to: _____ Follow up date: _____

d. Correction verified: _____ Date: _____

Item number _____ Safety contact employee (print name) _____

a. Safety issue: _____

b. Recommendation: _____

c. Assigned to: _____ Follow up date: _____

d. Correction verified: _____ Date: _____

H&S 068 1/4/93

The Earth Technology Corporation

Contractor Sign-In Sheet

Company	Representatives Name and Title	Address	Phone No.	Fax No.

U.S. ARMY ACCIDENT REPORT

For use of this form, see: AR 385-40, the proponent agency is OCSA

FOR USASC USE ONLY

Requirement Control Symbol CSOCS-308

SECTION A - ACCIDENT INFORMATION

1. CHECK ONE ☐ a. INITIAL ☐ b. CHANGE
2. UIC (Unit Identification Code) (6-Digit Code of Unit Having Accident)
3a. UNIT NAME AND MILITARY ADDRESS
3b. BRANCH (Armor, Infantry, etc.)
4. DATE OF ACCIDENT — a. YR | b. MO. | c. DAY
5. TIME OF ACCIDENT (Local Military Time)
6. PERIOD OF DAY (Check one) ☐ a. Day ☐ b. Night
7. ACCIDENT OCCURRED (Check one) ☐ a. On Post ☐ b. Off Post
8. IF ON POST, NAME OF INSTALLATION/FACILITY
9. ACCIDENT OCCURRED DURING (Check one) ☐ a. Combat ☐ b. Non-Combat
10. WERE EXPLOSIVES OR AMMUNITION INVOLVED OR PRESENT? ☐ Yes (See Instruction Book) ☐ No
11. EXACT LOCATION OF ACCIDENT (Detailed enough to locate site) (State type of location.)

SECTION B - PERSONNEL INFORMATION

12. NAME (Last, First, MI)
13. SOCIAL SECURITY NUMBER (SSN)
14. AGE
15. SEX (Check) ☐ a. Male ☐ b Female
16. RANK OR GRADE
17. MOS OR JOB SERIES
18. ADDRESS (Use Official Address for All Military or Government Personnel) (If different than block 3, add UIC.)
19. DUTY STATUS AT TIME OF ACCIDENT (Check one) ☐ a. On Duty ☐ b. Off Duty
20. FLIGHT STATUS (Check one) ☐ a Yes ☐ b. No
21. CONTINUOUS DUTY (hrs.) (Without sleep)
22. HRS. SLEEP IN LAST 24
23. DAYS LOST (Est. no. of days lost from work; not counting day of injury. Bed rest on quarters.)
24. DAYS HOSPITALIZED (Est. no. of days hospitalized receiving treatment; not for observation only.)
25. DAYS OF RESTRICTED WORK ACTIVITY (Est. number of days person cannot perform regular duties; light duty/profile.)

26. SEVERITY OF ILLNESS/INJURY (Check One)

- a. **Fatal.**
- b. **Permanent Total Disability.** Person can never again do gainful work.
- c. **Permanent Partial Disability.** Person loses or can never again use a body part.
- d. **Days Away from Work.** Person misses one or more workdays; bed rest/on quarters.
- e. **Restricted Work Activity.** Person is temporarily unable to perform regular duties; light duty/profile.
- f. **First Aid Only.** Person has one-time treatment of minor injury. (No lost work days.)
- g. **No Injury.**

27. CLASSIFICATION AT TIME OF ACCIDENT (Check)

- a. Active Army
- b Army Civilian
- c. Army Contractor
- d. Nonappropriated Fund (NAF)
- e. Other U.S. Military
- f ROTC
- g. Dependent
- h. NGB Tech
- i. NGB IDT
- j NGB AT
- k. NGB ADSW
- l. NGB AGR
- m. NGB ADT
- n. USAR IDT
- o. USAR AT
- p. USAR ADT
- q. USAR FTM
- r. Foreign Nat. Direct Hire
- s. Foreign Nat. Indirect Hire
- t. Foreign Nat. KATUSA
- u. Foreign Mil. Attached to the U.S. ARMY
- v. Public
- w. Not reported

28. CAUSE OF INJURY/OCCUPATIONAL ILLNESS (Check the most serious)

- a. Struck Against
- b. Struck By
- c. Fall from Elevation
- d. Fall from Same Level
- e. Caught In/ Under/ Between
- f. Rubbed/abraded
- g. Bodily Reaction
- h Overexertion
- i Exposure
- j External Contact
- k. Ingested
- l Inhaled

29. BODY PART(S) AFFECTED (Check primary) (No more than 3)

- a. Body (General)
- b. Head
- c. Forehead
- d. Eyes
- e. Nose
- f. Jaw
- g. Neck
- h. Trunk
- i. Chest
- j. Heart
- k. Back
- l Shoulder
- m Arm
- n. Wrist
- o. Hand
- p. Fingers
- q. Leg
- r. Knee
- s. Ankle
- t. Foot
- u. Toes
- v. OTHER (Specify)

30. TYPE OF INJURY/ILLNESS (Check the most serious)

- a. Burns (Chemical)
- b. Burns (Thermal)
- c. Amputation
- d. Decompression Sickness
- e. Asphyxiation (Suffocation)
- f Fractures
- g. Dislocation
- h. Abrasions
- i. Concussion
- j Sprain/Strain
- k. Cuts/Lacerations
- l. Contusion
- m. Puncture Wound
- n. Hernia, Rupture
- o. Frostbite
- p. Heat Stroke
- q Heat Exhaustion
- r Noise Injury/Illness

DA FORM 285, JAN 92 DA FORM 285, AUG 80 AND DA FORM 285-1, AUG 80 ARE OBSOLETE

SECTION B - PERSONNEL INFORMATION *(Continued)*

31. Person's action(s) at time of accident *(Check one and explain in Block 32.)*

a. Soldiering	j. Test/Study/Experiments	s. Fabricating	aa. Hobbies
b. Combat Soldiering	k. Educational	t. Handling Material/Passengers	bb. Passenger
c. Physical Training	l. Information and Arts	u. Janitorial/ Housekeeping/ Grounds Keeping	cc. Human movement
d. Weapons Firing	m. Food and Drug Inspection		dd. Horseplay
e. Engineering or Construction	n. Laundry/Dry Cleaning Services	v. Food/Drink Preparations	ee. Bystanding/spectating
f. Communications	o. Pest/Plant Control	w. Supervisory	ff. Personal Hygiene/Food/Drink Consumption/Sleeping
g. Security/Law Enforcement	p. Operating Vehicle or Vessel	x. Office	gg. Parachuting *(See instructions)*
h. Fire Fighting	q. Handling Animal	y. Counseling/Advisory	
i. Patient Care *(People/Animals)*	r. Maintenance/Repair/Servicing	z. Sports	

32. SPECIFIC DESCRIPTION OF ACTIVITY/TASK

33. ON FIELD EXERCISE *(Check one)*
- ☐ a. Yes (If YES, specify name of exercise.) —
- ☐ b. No

34. ACTIVITY PART OF TACTICAL TRAINING? *(Check one)*
- ☐ a. Yes
- ☐ b. No

35. Type of training facility being used *(Check one)*

a. Garrison	d. NTC	g. Std. range facility/ live fire
b. Local training area	e. JRTC	h. Other *(Specify)*
c. Major training area	f. CMTC	

36. Type of training participating in at the time of accident *(Check/specify)*

a. School *(Specify)*			
b. Unit →	(1) Platoon	(2) Crew	(3) Individual
c. On-the-job training	d. Other *(Specify)*		

37. Last time individual received training prior to accident on activity specified in block 31? *(Check one)*

a. 0 - 3 months	e. 1 - 2 years
b. 3 - 6 months	f. More than 2 years
c. 6 - 9 months	g. Never
d. 9 - 12 months	h. Not applicable

38. Required protective equipment

CHECK APPROPRIATE BLOCK(S)	AVAILABLE? YES	AVAILABLE? NO	USED? YES	USED? NO	N/A
a. Seat belt					
b. Helmet					
c. Goggles/glasses					
d. Gloves					
e. Ear plugs					
f. Other *(Specify)*					

39. INDIVIDUAL LICENSED TO OPERATE VEHICLE/EQUIPMENT? *(Check one)*
- ☐ a. Yes ☐ b. No ☐ c. N/A

40. DID ALCOHOL CAUSE/CONTRIBUTE TO THIS ACCIDENT? *(Check one)*
- ☐ a. Yes ☐ b. No ☐ c. Unknown

41. If drugs caused/ contributed to this accident, check appropriate block.
- a. Prescription
- b. Illegal
- c. Over-the-counter
- d. None

42. Were vision enhancement devices being used? *(Check appropriate block.)*
- a. Yes *(Specify type/model in c and d.)*
- b. No

c. TYPE	d. MODEL

43. Standard/Reference covering activity/task
- a. Soldier's Manual *(Task No.)*
- b. CTT *(Task No.)*
- c. AR/TM/FM *(Specify)*
- d. SOP
- e. None *(Go to block 45.)*

44. WAS ACTIVITY/TASK PERFORMED IAW STANDARD/REFERENCE? *(Check one)*
- ☐ a. Yes ☐ b. No *(If NO, complete blocks 46-47.)*

45. DID INDIVIDUAL MAKE A MISTAKE? *(Check one)*
- ☐ a. Yes *(If YES, complete blocks 46-47.)* ☐ b. No

46. What was the mistake? How was the activity/task performed incorrectly? *(Explain below.)*

47. Why was mistake made/activity performed incorrectly? *(Check the most important reason and specify in Block 63.)*

a. Inadequate school training *(content/amount)*	f. In a hurry	k. Inadequate services
b. Inadequate unit training *(content/amount)*	g. Poor/bad attitude	l. Improper equipment design
c. Inadequate on-the-job training *(content/amount)*	h. Lack of rest/sleep	m. Inadequate written procedures *(AR, TM, SOP)*
d. Fear/ excitement	i. Effects of alcohol/drugs	n. Improper supervision
e. Overconfident in own/others abilities	j. Inadequate facilities	o. Other *(Specify in narrative)*

SECTION B - PERSONNEL INFORMATION *(Continued)*

48. Time licensed on this vehicle *(Check one)*	49. Total AMV driving mileage *(Check one)*	50. Total time in unit *(Check one)*
☐ a. Less than one year	☐ a. Less than 1,000 miles	☐ a. Less than 6 months
☐ b. One to two years	☐ b. 1,000 - 5,000 miles	☐ b. 6 months - 1 year
☐ c. Over two years	☐ c. 5,000 - 10,000 miles	☐ c. Over one year
☐ d. Unlicensed	☐ d. Over 10,000 miles	

51. WHICH ITEM FROM SECTION C APPLIES TO THE INDIVIDUAL NAMED IN BLOCK 12? *(This is needed in order to relate the person in block 12 to the equipment/vehicle below.)*

☐ Item A ☐ Item B ☐ Item C ☐ OTHER *(Specify)*

SECTION C - PROPERTY/MATERIAL INVOLVED *(Whether Damaged or Not)*

	ITEM A	ITEM B	ITEM C
52 Type of item			
53 Model number			
54 Ownership *(DOD, DA, POV, Unit, Person)*			
55 Dollar cost of damage			
56 Rollover protection system installed?	☐ Yes ☐ No ☐ NA	☐ Yes ☐ No ☐ NA	☐ Yes ☐ No ☐ NA
57 Was this item being towed?	☐ Yes ☐ No ☐ NA	☐ Yes ☐ No ☐ NA	☐ Yes ☐ No ☐ NA
58. If towed, enter letter for item doing towing			
59 Types of collision codes *(Pick up to three from list below and enter in blocks) (in sequence)*			

Types of Collisions

1 - Going forward and collided with moving vehicle
2 - Going forward and collided with parked vehicle
3 - Collision while backing
4 - Collision with pedestrian
5 - Collision with object (other than vehicle/pedestrian
6 - Overturned
7 - Ran off the road
8 - Jackknifed
9 - Going forward and rear-ended moving vehicle
10 - Going forward and rear-ended parked vehicle
11 - Collision while turning
12 - Other *(Specify)*

60. **Component/Part that Failed/Malfunctioned** *(Complete this section if a materiel failure/malfunction caused/contributed to the accident.)*

	ITEM A	ITEM B	ITEM C
a. National Stock Number			
b. Part Number			
c. Describe Part			
d. Manufacturer's Identification Code			
e. EIR/ODR Number			

61 How/Why Part Malfunctioned *(Select code from "How" list below and enter in first block; select code from "Why" list and enter in second block.)*	ITEM A HOW	ITEM A WHY	ITEM B HOW	ITEM B WHY	ITEM C HOW	ITEM C WHY

***How Part Failed/Malfunctioned* Codes**

1 - Overheated/burned/melted
2 - Froze *(temperature)*
3 - Obstructed/pinched/clogged
4 - Vibrated
5 - Rubbed/worn/frayed
6 - Corroded/rusted/pitted
7 - Overpressured/burst
8 - Pulled/stretched
9 - Twisted/torqued
10 - Compressed/hit/punctured
11 - Bent/warped
12 - Sheared/cut
13 - Decayed/decomposed
14 - Electric current action
15 - Unknown/Other
Blank - Not reported

***Why Part Failed/Malfunctioned* Codes**

1 - Improper equipment design
2 - Inadequate maintenance
3 - Inadequate manufacture of equipment
4 - Inadequate written procedures *(AR, TM, SOP)*
5 - Improper supervision
6 - Unknown
7 - Other *(Specify in narrative)*

SECTION D - ENVIRONMENTAL CONDITIONS INVOLVED

62. Environmental conditions. *(Check environmental conditions present and indicate if condition caused/contributed to the accident.)*

PRESENT	CAUSED CONTRIBUTED	CONDITION	PRESENT	CAUSED CONTRIBUTED	CONDITION
		a. Clear/dry visibility unlimited			k. Wind gust/turbulence
		b. Bright, glare			l. Vibrate, shimmy, sway, shake
		c. Dark, dim			m. Radiation (laser, sunlight)
		d. Fog, condensation, frost			n. Holes, rocky rough, rutted, uneven
		e. Mist, rain, sleet, hail			o. Inclined/steep
		f. Snow, ice			p. Slippery *(not due to precipitation)*
		g. Dust, fumes, gasses, smoke, vapors			q. Air pressure *(bends, decompression, altitude, hypoxia)*
		h. Noise, bang, static			r. Lightning, static electricity, ground
		i. Temperature/humidity *(cold, heat)*			s. OTHER *(Specify)*
		j. Storm, hurricane, tornado			

SECTION E - ACCIDENT DESCRIPTION/NARRATIVE *(From blocks 10, 47)*

63. GIVE THE SEQUENCE OF EVENTS THAT AMPLIFY/EXPLAIN WHAT HAPPENED, LEADING UP TO AND INCLUDING THE ACCIDENT. *(Explain why accident happened.)*

64a. PRINTED/TYPED NAME OF PERSON COMPLETING THIS REPORT	64b. RANK	64c. TITLE	
64d. SIGNATURE		64e. DATE OF SIGNATURE *(YYMMMDD)*	64f. TELEPHONE NO.

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SECTION F - CORRECTIVE ACTION AND COMMAND REVIEW

65. DESCRIBE THE ACTIONS TAKEN, PLANNED, OR RECOMMENDED TO ELIMINATE THE CAUSE(S) OF THIS ACCIDENT *(from unit level up to HQDA)*.

66a. PRINTED/TYPED NAME OF COMMANDER		66b. RANK
66c. SIGNATURE	66d. DATE OF SIGNATURE *(YYMMMDD)*	66e. TELEPHONE NO.

	a. TYPED NAME	b. SIGNATURE	c. TITLE	d. RANK / DATE
67				
68				
69				

SECTION G - *SAFETY OFFICE USE ONLY*

70. LOCAL REPORT NO	71. MACOM

72. **Accident type** *(Check choice)*

	a. Army Motor Vehicle		h. Other Army Vehicle		o. Personal Injury - Other
	b. Army Combat Vehicle		i. Fire		p. Property Damage - Other
	c. Army Operated Vehicle		j. Chemical Agent		q. POV - On Official Business
	d. POV - Not on Official Business		k. Explosive		r. Space
	e. Marine Diving		l. Missile		s. Commercial Carrier/Transportation
	f. Marine Underway		m. Radiation		
	g. Marine Not Underway		n. Nuclear		

73. NAME OF SAFETY POINT OF CONTACT *(POC)*	74. PHONE NO. OF SAFETY OFFICE POC *(AUTOVON, Commercial, Etc.)*	75. DATE REPORT COMPLETED BY SAFETY OFFICE *(YYMMMDD)*

SECTION H - SPECIAL INTEREST AND/OR SUPPLEMENTAL INFORMATION

76	
77	
78	
79	

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U.S. ARMY ACCIDENT REPORT Instructions

General. The unit having the accident must investigate it and complete this report. Complete the shaded portions *only* for: Military off-duty, non-fatal accidents; and military on-duty accidents resulting in less than 20 lost workdays. Accidents involving 20 or more lost workdays and/or total property damage of $2,000 or more will require completion of the entire report. Type or legibly print the report. Items may be continued on a blank sheet of paper and attached to the report. Items listed below are keyed to the block numbers of DA Form 285, May 91. Items not listed here are self explanatory. Specific questions concerning this form should be referred to the local safety office.

SECTION A - Accident Information

Note: This section should be completed for the initial report and for any changes to a previously submitted report.

1. Check "INITIAL" if this is the first report on the accident. Check "CHANGE" if this report is a change to a previously submitted report of the accident.

2. Enter the 6-digit Unit Identification Code *(UIC)* for the unit responsible for the accident *(e.g., WXXXXX)*.

3. Provide military unit information for the unit listed in Block *2*.

a. Full military address *(e.g., C Troop, 1/17 Cavalry, Ft. Bragg, NC 12345-6789)*.

b. Provide the unit branch *(e.g., Armor, Infantry, Transportation)*.

4. Enter the year, month, and day of the accident *(e.g., 90 11 07 {7 November 1990})*.

5. Enter the military time the accident occurred *(e.g., 0815, 2300)*.

7. Check either item *a* or *b*, depending on the location of the accident.

8. If item *a* is checked, state name of post or installation *(e.g., Ft. Bragg, NC; Federal Center, Atlanta, GA; Ft. Hood, TX; Shaw AFB, SC)*.

9. Check item *a* if accident occurred in a theater of hostile fire or enemy action, but not as a result of such fire/action. This includes direct preparation for combat, actual combat, or redeployment from a combat theater.

10. Check "Yes" if explosives *(C-4, TNT)*, ammunition, or pyrotechnics were involved and explain in Block *63* its involvement and specify the National Stock Number *(NSN)*.

11. Give enough detail to find the exact location of the accident *(e.g., building number, street or highway name, state and/or country)*. Also state the type of location *(e.g., road intersection, tank trail, family housing, firing range)*.

SECTION B - Personnel Information

Note: Complete this section for each individual involved and/or injured in the accident. "Involved" means any person who was injured, or who took actions, or made decisions which caused or contributed to the accident. If more than one person was involved, enter information on one person on the initial form and complete only Sections A and B on additional forms for others. Staple all forms together.

16. Enter individual's rank/grade *(e.g., E5/SGT, O3/CPT, GS-11, WG-8)*. Complete for all Government personnel.

17. Enter individual's full MOS/Job Series *(e.g., 54E20, 11B40, GS-301)*.

18. Provide individual's full ***Military*** address for all Government personnel. If this address is not the same as that in Block *3a*, provide the unit UIC.

21. State how many continuous hours without sleep this individual was on-duty prior to the accident.

22. Indicate how many hours of continuous sleep this individual had in the past 24 hours.

23. State the estimated number of days this individual will be away from work *(totally unable to perform any work, bed rest/on quarters)*. Does not include days hospitalized.

24. State the estimated *(or actual)* number of days this individual is hospitalized *(inpatient/admitted)* receiving treatment. Days hospitalized for "observation only" are not reported.

25. State the estimated number of days this individual will not be able to perform his or her regular duties *(light duty, profile)*.

26. Check appropriate block. If more than one applies, check the most severe.

28. For this individual's "most severe injury", check the appropriate block(s) *(no more than 3)* that indicate the cause of the injury.

29. **Number** the body part(s) most seriously injured *(no more than 3)* in their order of priority *(the most serious first)*. Be as specific as possible.

30. For each body part numbered in block *29*, place a corresponding number to indicate the type of injury received *(select only the most serious)*.

31. Check the appropriate block that best describes the individual's action at the time of the accident. If Block *31gg* is checked, complete Blocks *76* and *77* of Section H, as indicated by these instructions.

32. Provide a short but detailed explanation of the item checked in Block *31*.

Note: For this report, the following definitions apply:

Tactical Training - Training in a field environment that uses or develops combat or combat support skills.

Field Exercise and Tactical Training - This begins when the individual reports to his or her primary duty location for movement to the field site and ends when he or she arrives back at the primary duty location from the field.

33. Check "Yes" if activity listed in Block *31* was part of a field exercise. State name of exercise if it has a name *(e.g., Team Spirit, Reforger)*.

42. If vision enhancement device(s) were used, specify type and model numbers, and whether they caused the accident *(e.g., Night Vision Goggle, AN-PVS5A)*.

43. Provide standard or reference *(Soldier's Manual, AR, TM, etc.)*, if it exists, that covers performance of the activity identified in Block *31*.

46. Provide a simple explanation of the mistake(s) or how the activity or task was performed incorrectly *(e.g., SGT Smith improperly backed his M915 truck without a ground guide)*.

47. **In your opinion,** why was the mistake made or the activity performed incorrectly? Check the most important reason.

51. Check the block corresponding to the piece of equipment associated with the person in Block *12 (e.g., SGT Adams was driving the "at-fault" HMMWV; his name will be in Block 12, and his vehicle will be item a in Section C below)*.

SECTION C - Property/Material Involved

Complete Blocks *52-59* on each piece of property or item of equipment involved in the accident *(whether damaged or not)*. Include Army and non-Army, as well as equipment whose use or misuse contributed to the accident. Include up to 3 items of equipment on the initial form. Use additional blank sheets of paper for other equipment if necessary, continuing letter sequence *(e.g., A, B, C, D, and E)*.

52. Type of equipment *(e.g., sedan, truck, generator)*.

53. Full military equipment model number or civilian make *(e.g., M109A2, M60A2, Ford Taurus, M16 Rifle)*.

55. Estimated cost of damage *(ECOD)* or actual cost of damage *(ACOD)* for each piece of property, which includes costs of parts and labor.

57. Indicate if this specific item was being towed ***at the time of the accident.***

58. If Block *57* is "yes", indicate which item was doing the towing.

60. Complete for each component or part whose failure or malfunction contributed to the accident. Include the EIR/QDR number in Block *60e*.

61. Indicate how and why each component or part failed or malfunctioned by selecting from the lists provided and entering the appropriate number in the blocks provided.

SECTION D - Environmental Conditions Involved

62. Check the environmental conditions present at the time of the accident *(no more than 3)* by checking appropriate blocks, whether contributing to the accident or not. Also check whether they caused or contributed to the accident.

SECTION E - Accident Description/Narrative

63. Fully describe the sequence of events that lead up to and caused the accident. Explain how and why the accident occurred. Also include information required from Blocks *10* and *47*.

SECTION F - Corrective Action and Command Review

Note: The level of command review *(Company, Battalion, Division, etc.)* is determined by either the major Army command *(MACOM)* or installation policy.

65. Fully describe all actions taken, planned, or recommended to eliminate the cause(s) of this accident. Actions should be identified as appropriate at unit level, and all the way up to HQDA level.

SECTION G - SAFETY OFFICE USE ONLY

71. MACOM responsible for this accident *(FORSCOM, TRADOC, etc.)*.

SECTION H - Special Interest/Supplemental Information

This section is for use by the U.S. Army Safety Center, MACOMs, or interested safety offices to obtain additional "Special Interest/Supplemental Information" on this accident as needed *(e.g., M1 tank tires, tactical parachute accidents, etc.)*. Blocks *76* and *77* have been designated for collection of supplemental information on parachuting accidents.

Blocks *76* and *77*. If Block *31gg* was checked, provide the following supplemental information for each individual:

a. Name of jumper;
b. Jumper height;
c. Jumper weight;
d. Type of jump *(static line, non tactical; static line, mass technical; freefall, non tactical; freefall, tactical)*;
e. Type of parachute and model;
f. Jumper's equipment *(list)*;
g. Weight of equipment;
h. Wind direction and speed at
   (1) Jump height,
   (2) Drop zone;
i. Jump altitude;
j. Jumper's position in stick and door exited;
k. Time pre-jump conducted;
l. Date of last jump and type of jump;
m. Number of previous jumps;
n. Date graduated from basic airborne training *(year and month)*;
o. Type of aircraft;
p. Accident cause(s). Improper exit, static line injury, broken static line, parachute malfunction, entanglement, lost or stolen air, oscillation, unstable position, dragged on DZ, tree landing, drop zone hazard *(specify)*, or other.

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APPENDIX E
NATURAL HAZARDS

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NATURAL HAZARDS

All field personnel should be familiar with the basic natural hazards that may be encountered during the field investigation. With this knowledge, field personnel can better avoid dangerous situations. Should a bite or sting occur, first aid should be applied immediately and medical treatment sought when necessary. Briefly, potential natural hazards in the Woodbridge, Virginia area include, but are not limited to, the following flora, fauna, and terrain.

INSECTS

- **Ticks:** small arachnids that are larger than mites and come in a variety of forms and sizes; they attach themselves to warm-blooded animals and extract blood from them; it should be noted that they are carriers of at least two diseases in this area, including Rocky Mountain Spotted Fever and Lyme Disease.

  - **Rocky Mountain Spotted Fever** is carried by some ticks and can be fatal. Symptoms can include fever, headache, and chills a few days after finding an attached tick.

  - **Lyme Disease** is usually carried by the small deer tick. It may take as long as 72 hours of feeding to transmit the infection, so brief contact should not be cause for alarm. Symptoms can include a red rash around the point of entry and/or flulike ailments. Antibiotics are usually effective in relieving the symptoms and preventing progression of the disease to more serious stages. If left untreated for weeks or months, the disease can cause serious nerve and heart ailments including meningitis and myocarditis. Months to years after the initial infection, affected people can develop arthritis that may last for years.

  Ways to protect yourself from ticks:

  - When in the woods, wear clothing that covers the skin and fits snugly around the wrists, ankles, and waist;

  - Wear light-colored clothing to make it easier to spot ticks;

  - Use tick repellents when in areas known or suspected to be tick infested;

  - Apply tick repellent to clothing, concentrating on areas most accessible to ticks (for example, shoe tops, socks, and pant cuffs);

  - After being in a tick-infested area, check closely for any small ticks on your skin (especially the scalp and hair) and clothing. If an attached tick is found, remove it exercising care not to squeeze its abdomen as this can cause expulsion of tick fluids into the wound.

- **Chiggers:** red 6-legged mite larva that is approximately the size of a pin head; it sucks blood and causes intense itching/irritation.

  - Refer to methods outlined above for protecting against ticks. Flowers of sulfur (sulfur powder that is sold at drugstores) also are known to be a chigger repellent.

- **Fire Ants:** any of a genus (*Solenopsis*) of fiercely stinging ants.

- **Bees and Wasps: some people are** highly allergic to stings from these insects (and if so, should ask their physician for an emergency sting kit and carry it at all times).

- **Spiders**: venomous spiders that are indigenous to this area include the Black Widow and the Brown Recluse.

  - **Black Widows** are shiny black spiders with long legs, ¼-inch in size. The females have an hourglass-shaped red mark on the underside of the abdomen.

  - **Brown Recluses** are brown spiders that are approximately ½- to ⅝-inch in size. They have long legs and are distinctive in that they have a dark brown fiddle-shaped marking on the underside. These spiders produce a dangerous neurotoxin.

  A rule of thumb related to spiders: be alert to spider webs in the field and try to avoid walking through them.

POISONOUS PLANTS

- **Poison Ivy:** a plant (*Rhus toxicodendron*) that is characterized by leaves arranged in threes and ranges from less than a foot to five feet in height when it is free-standing and taller when climbing; it has greenish flowers, white berries, and its leaves turn yellow in the fall. When oils from this plant contact skin, they can produce a rash and intense dermal itching.

- **Poison Sumac:** a shrub (*Toxicodendron vernix*) characterized by pinnate leaves that have red stems and leaf veins, clusters of greenish yellow flowers that produce ivory-white drupes, and poisonous oils that irritate the skin.

ANIMALS

- **Rabid Animals:** various mammals may carry rabies; rabid animals tend to approach people instead of avoiding them. Beware of nocturnal animals active during the day (for example, raccoons).

- **Dogs:** be aware that dogs encountered in the wild tend not to be "man's best friend," even if they look like "Lassie!" Two dogs together constitute a pack (which has a tendency toward fierce behavior) and can pose significant threat. Beware of roaming dogs, particularly large dogs that instinctively hunt on sight (for example, collies and shepherds). Some breeds are notorious for erratic fits of violent behavior (for example, cocker spaniels and English Springer spaniels). Other dogs have been bred as guard dogs or fighting dogs (e.g., Dobermans, Rottweilers, Boxers, Bulldogs).

  In addition, dogs that are unconfined are more likely to contract rabies. Beware of dogs that are foaming at the mouth or showing their teeth. Upon encountering such a dog, do not make any sudden moves. Do not make direct eye contact with the dog. Back slowly away from the animal. Never turn your back on an unknown dog.

  As a rule of thumb, it is a good idea to carry a large stick for self defense (which also can serve as a hiking aid on some sites).

- **Snakes:** two types of poisonous snakes are indigenous to the Woodbridge area: the Northern Copperhead and the Timber Rattlesnake. Contrary to popular belief, Cottonmouths (a.k.a. water moccasins) are not indigenous to this area. Snakes that are indigenous to the area and the places where they tend to be found are described below. Refer to a field guide (e.g., Peterson's) for color pictures.

  - Northern Copperhead is characterized by a coppery-red head and an hourglass pattern consisting of dark chestnut crossbands that are wide at the sides and narrow at the center of the back. Small dark spots are frequently present between crossbands, and dark rounded spots exist between the crossbands at the base of the belly. Young Northern Copperheads are paler in color and have bright yellow tail tips. They also have a narrow dark line that extends from both sides of the eye and divides the dark head from the pale lips.

  - Rocky, wooded hillsides and mountainous areas are typical habitats. Abandoned and rotting slab (the outer strips of logs) or sawdust piles also attract these snakes.

  - **Timber Rattlesnake** can have either one of two different color patterns:

    -- **Yellow-phase:** black or dark brown crossbands on a background color of yellow, brown, or gray; the crossbands, which may be V-shaped, break up anteriorly to form a row of dark spots down the back plus a row along each side of the body.

-- **Black phase:** a heavy stippling of black or very dark brown hides much of the lighter pigment; completely black specimens are not unusual in the uplands of the Northeast.

Young rattlesnakes are always cross-banded as in the yellow phase, but with darker colors.

– The Timber Rattlesnake is the only rattlesnake in the populous Northeast. Although it is still common in some mountainous regions (for example, the Blue Ridge Mountains), it is almost completely extirpated in many areas where it was once abundant (for example, the Woodbridge area). As its name indicates, this is a snake of timbered terrain, preferring areas of second growth where rodents abound.

The bite from a snake is extremely painful and swells rapidly. The victim should be taken to the hospital quickly.

ROUGH TERRAIN

- Unstable footing can be created by a variety of conditions such as steep slopes, wet rocks or leaves, uneven ground concealed by overgrown vegetation or leaves, and a rapidly-moving stream.

- Dense vegetation may include briery plants and partially-concealed vegetation such as woody or briery vines that can cause cuts and/or facilitate tripping, if not noticed.

Exercise care under such conditions since they can cause injury and can result in damage to field equipment.

APPENDIX F
DRILLING EQUIPMENT OPERATIONS

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DRILLING EQUIPMENT OPERATIONS

1. GENERAL DRILLING PRACTICES

Prior to the start of site work, the drilling subcontractor will inspect all drilling equipment. The inspection will be documented in the field records. If field operations last longer than one week, the drilling equipment inspection must be repeated on a weekly basis.

Earth Technology will conduct geophysical clearance and determine the location of all underground utilities before the start of drilling operations. In addition to obtaining the utility locations from the client, Earth Technology will make a utility survey of each drilling point. The utility survey shall include both magnetometer and ground penetrating radar survey. Documentation that nearby utilities have been marked on the ground and that the drill site has been cleared shall be kept in the Earth Technology project trailer and confirmed to the drilling subcontractor.

The drilling subcontractor shall have documented safety and emergency action procedures for the equipment to be operated. The drilling contractor's employees will acknowledge in writing that they have read and understand these procedures. The drilling subcontractor shall ensure that all drilling equipment is well maintained, meets safety requirements, and is inspected daily during use. The drilling rig shall be operated by a qualified operator who can identify pending failures and supervise the driller's helper(s). Transportation of the drill rig to the work site shall be performed by a person with the proper commercial license. Drill rig maintenance and safety is the responsibility of the drilling subcontractor. The following information is provided as general guidelines for safe practices during drilling activities, and installation of monitoring/extraction wells and will be emphasized to the driller and helpers during the daily safety briefings.

1. No food or beverage will be consumed or stored in the work area.

2. Earth Technology will contact appropriate utilities agency to survey, mark and flag locations of buried utility lines.

3. Maintain orderly housekeeping on and around the drill rig.

4. Store tools, materials and supplies to allow safe handling by drill crew members. Proper storage on racks or sills will prevent spreading, rolling or sliding.

5. Avoid storage or transportation of tools, materials or supplies within or on the drill rig derrick.

6. Maintain working surfaces free of obstructions or potentially hazardous substances.

7. Store gasoline only in containers specifically designed or approved for such use.

8. Wear eye protection when chipping, chiselling or breaking material that presents risk of flying objects.

9. The departing driller should inform the oncoming driller of any special hazards or ongoing work that may affect the safety of the crew.

10. Fire fighting equipment should not be tampered with and should not be removed for other than the intended fire-fighting purposes or for servicing.

11. If lubrication fittings are not accessible with guards in place, machinery should be stopped for oil and greasing.

12. Rigging material equipment for material handling should be checked prior to use on each shift and as often as necessary to ensure it is safe. Defective rigging should be removed from service.

13. The area around the derrick ladder should be kept clear to provide unimpeded access to the ladder.

14. Work areas and walkways should not be obstructed.

15. The rotary table of the rig floor shall be kept free of obstructions and free of undue accumulation of oil, water, ice, or circulating fluids.

16. Make certain that all personnel are wearing hearing and sight protection.

2. MOVING RIG TO DRILLING LOCATION

17. Inspect the route of travel before moving drill rig off-road. Note rocks, trees, erosion, and uneven surfaces.

18. Remove all passengers from the cab before moving drill rig onto rough or sloped terrain. The operation and transportation of the drill rig must be by a qualified and licensed individual.

19. Engage multiple drive power trains (when available) on rig vehicle when mobilizing off-road.

20. Travel directly up or down grade on slopes when feasible. Avoid off-camber traverse approaches to drill sites.

21. Approach changes in grade squarely to avoid shifting loads or unexpected unweighting.

22. Use a spotter (person at grade) to provide guidance when vertical and lateral clearance is questionable.

23. Use hand brakes and block rigwheels when grades are steep.

24. Lower rig mast before moving rig.

25. Secure all loads to rig prior to off-road mobilization.

26. Earth Technology will use geophysical techniques, or equivalent, to locate buried utility lines.

27. Stabilize and level each work site prior to drill set-up.

3. RAISING MAST

28. Locate visually overhead and buried utilities prior to drilling operations.

29. Treat overhead electrical lines as if they were energized and maintain at least 40 feet clearance.

30. Earth Technology will contact appropriate utilities agency to manipulate and deactivate overhead service in areas that interfere with drilling operations. Do not attempt to handle utilities.

31. To the greatest extent possible, the terrain should be level (a minimum of 10 feet on each side of the drilling rig) and the condition of the ground such that unexpected movement of the drilling rig is unlikely. If the slope of the terrain is hazardous, the USAEC Project Manager and the USAEC SES Branch will be contacted for the selection of a safe drilling site.

32. The derrick must not be raised until the rig has been blocked, leveled, and chocked.

33. Note wind speed and direction to prevent overhead utility lines from contacting rig derrick. Allow at least 20 feet clearance between rig mast and utility lines.

4. HOISTING OPERATIONS

34. Drillers should never engage the rotary clutch without watching the rotary table and ensuring it is clear of personnel and equipment.

35. Unless the draw works is equipped with an automatic feed control, the brake should not be left unattended without first being tied down.

36. Drill pipe or casing should not be picked up suddenly.

37. Drill pipe should not be hoisted until the driller is sure that the pipe is latched in the elevator, or the derrick man has signaled that he may safely hoist the pipe.

38. During instances of unusual loading of the derrick or mast, such as when making an unusually hard pull, only the driller should be on the rig floor and no one should be on the rig or derrick.

39. The brakes on the draw works of every drilling rig should be tested by each driller, when he comes on shift, to determine whether they are in good order. The brakes should be thoroughly inspected by a competent individual each week.

40. A hoisting line with a load imposed should not be permitted to be in direct contact with any derrick member or stationary equipment, unless it has been specifically designed for line contact.

41. Workers should never stand near the well bore whenever any wire line device is being run.

42. Hoisting control stations should be kept clean and controls labeled as to their functions.

43. Inspect wire, rope, hoisting hardware, swivels, hooks, bearings, sheaves, guides, rollers, clutches, brakes for the following:

- abrasions
- breaks
- wear
- fatigue
- corrosion
- jamming
- kinking

44. Avoid the suspension of loads when hoist is unattended.

45. Prevent hoisting loads directly over field personnel.

46. Restrict hoisting operations during unfavorable environmental conditions such as rain or high winds.

47. Maintain safe hand distance from hoisting equipment (e.g., wire rope, hooks, pinch points) when slack is reduced.

5. Riding Hoisting Equipment

Under no circumstances will personnel be permitted to ride the traveling block or elevators, nor will the cat line be used as a personnel carrier.

6. Cat Line Operations

48. Only experienced workers will be allowed to operate the cat head controls. The kill switch must be clearly labeled and operational prior to operation of the cat line.

49. The cat head area must be kept free of obstructions and entanglements.

50. The operator should not use more wraps than necessary to pick up the load. More than one layer of wrapping is not permitted.

51. Personnel should not stand near, step over, or go under a cable or cat line which is under tension.

52. Employees rigging loads on cat lines should:

- Keep out from under the load
- Keep fingers and feet where they will not be crushed
- Be sure to signal clearly when the load is being picked up
- Use standard visual signals only and not depend on shouting to coworkers
- Make sure the load is properly rigged, since a sudden jerk in the cat line will shift or drop the load.

DRILLING EQUIPMENT OPERATIONS

Continued

7. PIPE HANDLING

53. Pipe should be loaded and unloaded, layer by layer, with the bottom layer pinned or blocked securely on all four corners. Each successive layer should be effectively blocked or chocked.

54. Workers should not be permitted on top of the load during loading, unloading, or transferring of pipe or rolling stock.

55. Employees should be instructed never to try to stop rolling pipe or casing; they should be instructed to stand clear of rolling pipe.

56. Slip handles should be used to lift and move slips. Employees should not be permitted to kick slips into position.

57. When pipe is being hoisted, personnel should not stand where the bottom end of the pipe could whip and strike them.

58. Pipe stored in racks, catwalks, or on flatbed trucks should be chocked to prevent rolling.

8. DERRICK OPERATIONS

59. The derrick climber should be used whenever climbing the derrick. Personnel on the derrick should be tied off, or otherwise protected from falling when working in an unguarded elevated position.

60. All stands of pipe and drill collars racked in a derrick should be secured with rope or otherwise adequately secured.

61. Tools, derrick parts, or materials of any kind should not be thrown from the derrick.

62. The elevators must be properly clamped onto all pipe joints prior to the driller engaging the load.

9. MAKING AND BREAKING JOINTS

63. Tongs should be used for the initial making up and breaking of the joint. The rotary table should not be used for the initial breaking of a joint.

64. Employees making or breaking joints should not be permitted to stand within the arc of the tong handles when the tong pull line is under tension. Employees should handle the tongs only by the appropriate handles.

65. Employees should be trained in the safe use of spinning chains. Spinning chains should not be handled near the rotary table while it is in motion.

10. DRILLING OPERATIONS

66. – Begin auger borings slowly with the drive engine operating at low speed.

67. Establish a communication system between driller, helper and geologist for responsibilities during drilling operations.

68. Engage auger to power coupling as recommended by manufacturer.

69. Restrict contact with power coupling or auger during rotation.

70. Prevent placing hands or feet under auger during rotation.

71. Prevent placing hands or feet under auger sections during hoisting over hard surfaces.

72. Avoid the removal of spoil cuttings with hands or feet.

73. Assure drill rig is in neutral and the augers are not rotating before cleaning augers.

74. All personnel working in and around the drill rig must be informed of the location of the kill switch.

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APPENDIX G
MATERIAL SAFETY DATA SHEETS

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DOD Hazardous Materials Information System
DoD 6050.5-L
AS OF May 1993

FSC: 1377
NIIN: 00N032273
Manufacturer's CAGE: 2H104
Part No. Indicator: A
Part Number/Trade Name: CENTER FIRE PISTOL & REVOLVER CARTRIDGES (S

General Information

Item Name:
Manufacturer's Name: REMINGTON ARMS CO INC
Manufacturer's Street: I-40 & HIGHWAY 15
Manufacturer's P. O. Box:
Manufacturer's City: LONOKE
Manufacturer's State: AR
Manufacturer's Country: US
Manufacturer's Zip Code: 72086
Manufacturer's Emerg Ph #: 501-676-3161
Manufacturer's Info Ph #: 501-374-2246
Distributor/Vendor # 1:
Distributor/Vendor # 1 Cage:
Distributor/Vendor # 2:
Distributor/Vendor # 2 Cage:
Distributor/Vendor # 3:
Distributor/Vendor # 3 Cage:
Distributor/Vendor # 4:
Distributor/Vendor # 4 Cage:
Safety Data Action Code:
Safety Focal Point: N
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SMJ
Date MSDS Prepared: 12AUG86
Safety Data Review Date: 21JUL92
Supply Item Manager:
MSDS Preparer's Name: W.G. BELL
Preparer's Company: SAME
Preparer's St Or P. O. Box:
Preparer's City:
Preparer's State:
Preparer's Zip Code:
Other MSDS Number:
MSDS Serial Number: BPMZL
Specification Number:
Spec Type, Grade, Class:
Hazard Characteristic Code: NK
Unit Of Issue:
Unit Of Issue Container Qty:
Type Of Container:
Net Unit Weight:
NRC/State License Number:
Net Explosive Weight:
Net Propellant Weight-Ammo:
Coast Guard Ammunition Code:

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Ingredients/Identity Information
==========
Proprietary: NO
Ingredient: LEAD (INORGANIC AND LEAD COMPOUNDS)
Ingredient Sequence Number: 01
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: OF7525000
CAS Number: 7439-92-1
OSHA PEL: 0.05 MG/M3
ACGIH TLV: 0.15 MG/M3
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: ANTIMONY (AND COMPOUNDS)
Ingredient Sequence Number: 02
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: CC4025000
CAS Number: 7440-36-0
OSHA PEL: 0.5 MG/M3
ACGIH TLV: 0.5 MG/M3
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: ARSENIC (AND COMPOUNDS)
Ingredient Sequence Number: 03
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: CG0525000
CAS Number: 7440-38-2
OSHA PEL: 0.01 MG/M3
ACGIH TLV: 0.2 MG/M3
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: BARIUM (AND COMPOUNDS)
Ingredient Sequence Number: 04
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: CQ8370000
CAS Number: 7440-39-3
OSHA PEL: 0.05 MG/M3
ACGIH TLV: 0.05 MG/M3
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: NITROGLYCERIN (NG) (SARA III)
Ingredient Sequence Number: 05
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: N

NIOSH (RTECS) Number: QX2100000
CAS Number: 55-63-0
OSHA PEL: 0.1 MG/M3 STEL,S
ACGIH TLV: 0.46 MG/M3,S
Other Recommended Limit: N/K

Physical/Chemical Characteristics

Appearance And Odor: GRAYISH-GRAY-SILVERY METAL-NO ODOR
Boiling Point: N/A
Melting Point: N/A
Vapor Pressure (MM Hg/70 F): N/A
Vapor Density (Air=1): N/A
Specific Gravity: N/A
Decomposition Temperature: N/K
Evaporation Rate And Ref: NOT APPLICABLE
Solubility In Water: SUPP DATA
Percent Volatiles By Volume: N/K
Viscosity:
pH: N/K
Radioactivity:
Form (Radioactive Matl):
Magnetism (Milligauss):
Corrosion Rate (IPY): N/K
Autoignition Temperature:

Fire and Explosion Hazard Data

Flash Point: NOT APPLICABLE
Flash Point Method: N/K
Lower Explosive Limit: N/A
Upper Explosive Limit: N/A
Extinguishing Media: MATERIAL IS SELF OXIDIZING; FLOOD WITH WATER TO FIGHT FIRE AND COOL SHELLS.
Special Fire Fighting Proc: WEAR NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT FOR PROTECTION AGAINST SHRAPNEL (FP N). EVACUATE IMMEDIATE AREA & DILUGE W/WATER.
Unusual Fire And Expl Hazrds: SHELLS WILL DETONATE WHEN EXPOSED TO OPEN FLAMES AND HIGH TEMPERATURES.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): FLAMES, SPARKS, PERCUSSION OR SHOCK AND HIGH TEMPERATURES.
Materials To Avoid: STRONG MINERAL ACIDS AND ALKALIS.
Hazardous Decomp Products: CO*X, NO*X & LEAD FUMES.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT.

Health Hazard Data

LD50-LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: ANEMIA, FATIGUE, NOCTORIA, EMBRYOTOXIC,

MALNUTRITION, WEAKNESS, MENTAL CONFUSION, PALLOR, TREAT FOR GENERAL LEAD EXPOSURE; HEADACHE AND NAUSEA. NOTE:(LEAD CAS#7439-92-1) APPEARS ON THE NAVY LISTING OF OCCUPATIONAL REPRODUCTIVE HAZARDS. SEEK CONSULTATION FROM APPROPRIATE HEALTH PROFESSIONALS (EFTS OF OVEREXPOSURE)
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: YES
Explanation Carcinogenicity: LEAD & LEAD COMPOUNDS:GROUP 2B (IARC). ARSENIC:KNOWN CARCINOGEN (NTP); GROUP 1 (IARC); OSHA REGULATED.
Signs/Symptoms Of Overexp: HLTH HAZ:CONCERNING LATEST HAZARD LIST INFORMATION & SAFE HANDLING AND EXPOSURE RECOMMENDATIONS (FP N).
Med Cond Aggravated By Exp: GASTROINTESTINAL TRACT, KIDNEYS, BLOOD AND CENTRAL NERVOUS SYSTEM.
Emergency/First Aid Proc: SKIN:FLUSH WITH WATER. INGEST:GET MD IMMEDIATELY. EYE:FLUSH WITH POTABLE WATER FOR A MINIMUM OF 15 MINUTES. CALL MD (FP N). INHAL:MOVE TO FRESH AIR. SUPPORT BREATHING (GIVE O*2/ARTF RESP) (FP N).

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: USE NON-SPARKING EQUIPMENT TO CLEANUP AND STORE SHELLS-AVOID IGNITION SOURCES.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: MATERIAL MAY BE BURNED PER APPROPRIATE FEDERAL, STATE AND LOCAL REGULATIONS.
Precautions-Handling/Storing: REFER TO SPILL PROCEDURES.
Other Precautions: LABEL CONTAINERS-"SMALL ARMS AMMUNITION" WEAR GLOVES AND SHRAPNEL PROTECTION.

Control Measures

Respiratory Protection: NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN (FP N).
Ventilation: NOT REQUIRED.
Protective Gloves: IMPERVIOUS GLOVES (FP N).
Eye Protection: CHEMICAL WORKERS GOGGLES (FP N).
Other Protective Equipment: HEARING PROTECTION WHEN DISCHARGING CARTRIDGES.
Work Hygienic Practices: WASH HANDS AFTER SKIN CONTACT WITH CARTRIDGES.
Suppl. Safety & Health Data: SOLUBILITY IN H*2O:LEAD AND LEAD STYPHNATE-INSOLUBLE; LEAD NITRATE-127 G/100CC H*2O @ 100C. PART NO: "SMALL ARMS AMMUNITION."

DOD Hazardous Materials Information System
DoD 6050.5-L
AS OF May 1993

FSC: 6810
NIIN: 00F026415
Manufacturer's CAGE: 1R664
Part No. Indicator: A
Part Number/Trade Name: BTX-96 BTEX IN WATER/SOIL

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General Information

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Item Name: LABORATORY STANDARD
Manufacturer's Name: ENVIRONMENTAL RESOURCE ASSOCIATES
Manufacturer's Street: 5540 MARSHALL ST
Manufacturer's P. O. Box: N/K
Manufacturer's City: ARVADA
Manufacturer's State: CO
Manufacturer's Country: US
Manufacturer's Zip Code: 80002-3108
Manufacturer's Emerg Ph #: 303-431-8454
Manufacturer's Info Ph #: 303-431-8454
Distributor/Vendor # 1:
Distributor/Vendor # 1 Cage:
Distributor/Vendor # 2:
Distributor/Vendor # 2 Cage:
Distributor/Vendor # 3:
Distributor/Vendor # 3 Cage:
Distributor/Vendor # 4:
Distributor/Vendor # 4 Cage:
Safety Data Action Code: A
Safety Focal Point: F
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SE
Date MSDS Prepared: 04APR91
Safety Data Review Date: 12MAR93
Supply Item Manager:
MSDS Preparer's Name:
Preparer's Company: ENVIRONMENTAL RESOURCE ASSOCIATES
Preparer's St Or P. O. Box: 5540 MARSHALL ST
Preparer's City: ARVADA
Preparer's State: CO
Preparer's Zip Code: 80002-3108
Other MSDS Number:
MSDS Serial Number: BQJDT
Specification Number:
Spec Type, Grade, Class:
Hazard Characteristic Code:
Unit Of Issue:
Unit Of Issue Container Qty:
Type Of Container:
Net Unit Weight:
NRC/State License Number:
Net Explosive Weight:
Net Propellant Weight-Ammo:
Coast Guard Ammunition Code:

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Ingredients/Identity Information
==========
Proprietary: NO
Ingredient: BENZENE (HUMAN CARCINOGEN BY ACGIH, IARC, OSHA, NTP) INTENDED CHANGE = IC
Ingredient Sequence Number: 01
Percent: <0.1
Ingredient Action Code: A
Ingredient Focal Point: F
NIOSH (RTECS) Number: CY1400000
CAS Number: 71-43-2
OSHA PEL: 1 PPM (8 HR TWA)
ACGIH TLV: 0.3 MG/CUM (A2)
Other Recommended Limit: 16 MG/CUM

Proprietary: NO
Ingredient: TOLUENE
Ingredient Sequence Number: 02
Percent: <0.1
Ingredient Action Code: A
Ingredient Focal Point: F
NIOSH (RTECS) Number: XS5250000
CAS Number: 108-88-3
OSHA PEL: 100 PPM
ACGIH TLV: 100 PPM
Other Recommended Limit: 375 MG/CUM

Proprietary: NO
Ingredient: O-XYLENE
Ingredient Sequence Number: 03
Percent: <0.1
Ingredient Action Code: A
Ingredient Focal Point: F
NIOSH (RTECS) Number: ZE2450000
CAS Number: 95-47-6
OSHA PEL: N/K
ACGIH TLV: 100 PPM
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: M-XYLENE
Ingredient Sequence Number: 04
Percent: <0.1
Ingredient Action Code: A
Ingredient Focal Point: F
NIOSH (RTECS) Number: ZE2275000
CAS Number: 108-38-3
OSHA PEL: N/K
ACGIH TLV: 100 PPM
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: P-XYLENE
Ingredient Sequence Number: 05
Percent: <0.1
Ingredient Action Code: A

Ingredient Focal Point: F
NIOSH (RTECS) Number: ZE2625000
CAS Number: 106-42-3
OSHA PEL: N/K
ACGIH TLV: 100 PPM
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: METHANOL (METHYL ALCOHOL), COLUMBIAN SPIRITS
Ingredient Sequence Number: 06
Percent: >99
Ingredient Action Code: A
Ingredient Focal Point: F
NIOSH (RTECS) Number: PC1400000
CAS Number: 67-56-1
OSHA PEL: 260 MG/CUM
ACGIH TLV: 262 MG/CUM (SKIN)
Other Recommended Limit: 200 PPM

Physical/Chemical Characteristics

Appearance And Odor: CLEAR, COLORLESS LIQUID ORGANIC ODOR
Boiling Point: 64.5C
Melting Point: N/K
Vapor Pressure (MM Hg/70 F): N/K
Vapor Density (Air=1): 1.11
Specific Gravity: 0.792
Decomposition Temperature: N/K
Evaporation Rate And Ref: N/K
Solubility In Water: COMPLETE
Percent Volatiles By Volume: N/K
Viscosity:
pH: N/K
Radioactivity:
Form (Radioactive Matl):
Magnetism (Milligauss):
Corrosion Rate (IPY): N/K
Autoignition Temperature:

Fire and Explosion Hazard Data

Flash Point: 15C
Flash Point Method: TOC
Lower Explosive Limit: N/K
Upper Explosive Limit: N/K
Extinguishing Media: DRY CHEMICAL, CO2, ALCOHOL FOAM.
Special Fire Fighting Proc: IF LARGE AMOUNTS INVOLVED IN FIRE USE SCBA & WET DOWN TO KEEP FROM EXPLODING. USE WATER MIST OR ALCOHOL FOAM.
Unusual Fire And Expl Hazrds: MAY FORM CO, PHOSGENE & CARBONYL BROMIDE WHEN INVOLVED IN FIRE.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): N/K
Materials To Avoid: CHROMIC ANHYDRIDE, IODINE, ETHANOL, MERCURIC, OXIDE, POTASSIUM HYDROXIDE, SODIUM HYDROXIDE/CHLOROFORM/LEAD PERCHLORATE.

Hazardous Decomp Products: N/K
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): N/K

Health Hazard Data

LD50-LC50 Mixture: N/K
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: INHALATION: LUNG, LIVER & KIDNEY DAMAGE. SKIN: IRRITATION, ALLERGIC DERMATITIS, DAMAGES ALL TISSUE. INGESTION: CANCER, CARDIAC ARRYTHMIA, HEART SENSITIZATION TO EPINEPHRINE, ACIDOSIS, LEUKEMIA, LYMPHOMA, APLASTIC ANEMIA & OTHER BLOOD DISORDERS.
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: YES
Explanation Carcinogenicity: SEE INGREDIENTS
Signs/Symptoms Of Overexp: N/K
Med Cond Aggravated By Exp: DERMATITIS, LIVER DISEASE, KIDNEY DISEASE.
Emergency/First Aid Proc: INHALATION: REMOVE TO FRESH AIR. SKIN/EYE: WASH W/PLENTY OF CLEAR WATER. INGESTION: GIVE SYRUP OF IPECAC, 60 CC WITH 180 CC WATER. BE PREPARED TO DO CPR. OBTAIN MEDICAL ATTENTION IN ALL CASES.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: DAM UP & ABSORB. VENTILATE THE AREA. CALL CLEANUP TEAM. DON'T WASH TO DRAINS.
Neutralizing Agent: N/K
Waste Disposal Method: DISPOSE OF IN ACCORDANCE W/FEDERAL, STATE & LOCAL REGULATIONS.
Precautions-Handling/Storing: AVOID FREEZING, BREAKAGE, STORE AWAY CHEMICALS. PRODUCT FOR LABORATORY USE ONLY. IT IS NOT INTENDED TO BE USED FOR ANY OTHER APPLICATION.
Other Precautions: AVOID CONTACT W/EYES/SKIN. USE ADEQUATE VENTILATION. THIS MATERIAL IS INTENDED TO BE USED BY TRAINED LABORATORY PERSONNEL.

Control Measures

Respiratory Protection: ORGANIC VAPOR CARTRIDGE, FULL FACE PIECE OR SELF-CONTAINED AIR SUPPLIED RESPIRATOR.
Ventilation: ADEQUATE. (MECHANICAL HOOD)
Protective Gloves: VITON OR VINYL
Eye Protection: SAFETY GLASSES
Other Protective Equipment: LABORATORY COAT & CLOSED SHOES.
Work Hygienic Practices: REMOVE & WASH CONTAMINATED CLOTHES BEFORE REUSE. WASH HANDS THOROUGHLY AFTER HANDLING.
Suppl. Safety & Health Data: N/K

DOD Hazardous Materials Information System
DoD 6050.5-L
AS OF May 1993

FSC: 5970
NIIN: 001885501
Manufacturer's CAGE: 90896
Part No. Indicator: A
Part Number/Trade Name: F250-1,ASBESTOS

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General Information

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Item Name: INSULATION TAPE
Manufacturer's Name: AMATEX CORP.
Manufacturer's Street: 1032 STANBRIDGE STREET
Manufacturer's P. O. Box:
Manufacturer's City: NORRISTOWN
Manufacturer's State: PA
Manufacturer's Country: US
Manufacturer's Zip Code: 19401-3666
Manufacturer's Emerg Ph #:
Manufacturer's Info Ph #:
Distributor/Vendor # 1:
Distributor/Vendor # 1 Cage:
Distributor/Vendor # 2:
Distributor/Vendor # 2 Cage:
Distributor/Vendor # 3:
Distributor/Vendor # 3 Cage:
Distributor/Vendor # 4:
Distributor/Vendor # 4 Cage:
Safety Data Action Code:
Safety Focal Point: D
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status:
Date MSDS Prepared: PRE-HCS
Safety Data Review Date: 03DEC81
Supply Item Manager: S9G
MSDS Preparer's Name:
Preparer's Company:
Preparer's St Or P. O. Box:
Preparer's City:
Preparer's State:
Preparer's Zip Code:
Other MSDS Number:
MSDS Serial Number: BDHKB
Specification Number: MIL-I-3053
Spec Type, Grade, Class:
Hazard Characteristic Code: T6
Unit Of Issue:
Unit Of Issue Container Qty:
Type Of Container:
Net Unit Weight:
NRC/State License Number:
Net Explosive Weight:
Net Propellant Weight-Ammo:
Coast Guard Ammunition Code:

Ingredients/Identity Information

Proprietary: NO
Ingredient: ASBESTOS (AMIANTHUS, OBSOLETE AMOSITE), (FOR OSHA PEL, SEE 29CFR 1910.1101)
Ingredient Sequence Number: 01
Percent: 80
Ingredient Action Code:
Ingredient Focal Point: D
NIOSH (RTECS) Number: CI6475000
CAS Number: 1332-21-4
OSHA PEL: 0.2 FIBERS/CC
ACGIH TLV: 0.5 FIBERS/CC; A1;89
Other Recommended Limit:

Physical/Chemical Characteristics

Appearance And Odor: WHITE,NO ODOR.
Boiling Point: N/A
Melting Point:
Vapor Pressure (MM Hg/70 F): N/A
Vapor Density (Air=1): N/A
Specific Gravity: 2.4-3
Decomposition Temperature:
Evaporation Rate And Ref: N/A
Solubility In Water: N/A
Percent Volatiles By Volume: N/A
Viscosity:
pH:
Radioactivity:
Form (Radioactive Matl):
Magnetism (Milligauss):
Corrosion Rate (IPY):
Autoignition Temperature:

Fire and Explosion Hazard Data

Flash Point: N/A
Flash Point Method:
Lower Explosive Limit: N/A
Upper Explosive Limit: N/A
Extinguishing Media: N/A
Special Fire Fighting Proc: N/A
Unusual Fire And Expl Hazrds: N/A

Reactivity Data

Stability: YES
Cond To Avoid (Stability):
Materials To Avoid: NONE
Hazardous Decomp Products: NONE
Hazardous Poly Occur: NO
Conditions To Avoid (Poly):

Health Hazard Data

LD50-LC50 Mixture:
Route Of Entry - Inhalation:
Route Of Entry - Skin:
Route Of Entry - Ingestion:
Health Haz Acute And Chronic:
Carcinogenicity - NTP:
Carcinogenicity - IARC:
Carcinogenicity - OSHA:
Explanation Carcinogenicity:
Signs/Symptoms Of Overexp: >5MM/CC LONG TERM:INCREASED RISK OF ASBESTOSIS,CANCER(BRONCHIAL,GASTROINTESTINAL,MESOTHELIOMA).
Med Cond Aggravated By Exp:
Emergency/First Aid Proc: EMERGENCY:USE NIOSH APPROVED RESPIRATORY PROTECTION(UP TP 100 FIBERS/CC AIR PURIFYING RESPIRATOR).CONSULT A DR. FOR DERMATITIS.WHEN ASBESTOS GETS INTO THE EUES,FLUSH WITH WATER FOLLOWED BY TREATMENTS OF OPHTHALMOLOGIST.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: UPON RELEASE OF FIBERS IN EXCESS OF ABOVE TLV,IT IS REQUIRED TO INCORPATE ENGINEERING CONTROLS,WORK PRACTICES,OR APPROVED RESPIRATORY PROTECTION,IN THAT ORDER.
Neutralizing Agent:
Waste Disposal Method: IF DISPOSAL PRODUCES FIBERS IN EXCESS OF ABOVE TLV,WASTES ARE TO BE COLLECTED & DISPOSED OF IN SEALED IMPERMEABLE BAGS OR OTHER SEALED CONTAINER.PLACE A PROPER SITE FOR DAILY PICK-UP OF SANITATION.
Precautions-Handling/Storing: STORE & HANDLE SUCH THAT FIBERS ARE NOT RELEASED IN EXCESS OF ABOVE TLV.WEAR DUST MASK,WORKING GLOVES AND SAFETY GOGGLES
Other Precautions: SEE SECTION 1910,1001 OF TITLE 29 CHAP.XVII- THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA).

Control Measures

Respiratory Protection: USE 3M NO.8710 DISPOSABLE OR OTHER NIOSH APPROVED FOR ASBESTOS.
Ventilation: LOCAL EXHAUST IS PREFERRED
Protective Gloves: WORKING
Eye Protection: SAFETY GOGGLES
Other Protective Equipment: DUST MASK;EXCESS OF TLV,FULL PROCTIVE CLOTHING
Work Hygienic Practices:
Suppl. Safety & Health Data: MIL-I-3053,INSULATION,ELECTRICAL,ASBESTOS-FIBER,TREATED 1 UNTREATED,FR D,GR UG, TY 4PU ; CEILING TLV IS 10 FIBERS/CC BASED ON 8-HR TWA, FIBER LENGTH IS >SUM.

DOD Hazardous Materials Information System
DoD 6050.5-L
AS OF May 1993

FSC: 6135
NIIN: 007670331
Manufacturer's CAGE: 08288
Part No. Indicator: A
Part Number/Trade Name: THERMAL BATTERY,401067

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General Information

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Item Name: THERMAL BATTERY
Manufacturer's Name: CECOM SAFETY OFFICE
Manufacturer's Street: FORT MONMOUTH
Manufacturer's P. O. Box:
Manufacturer's City: FORT MONMOUTH
Manufacturer's State: NJ
Manufacturer's Country: US
Manufacturer's Zip Code: 07703-5024
Manufacturer's Emerg Ph #: 908-544-3112
Manufacturer's Info Ph #: 908-544-3112
Distributor/Vendor # 1:
Distributor/Vendor # 1 Cage:
Distributor/Vendor # 2:
Distributor/Vendor # 2 Cage:
Distributor/Vendor # 3:
Distributor/Vendor # 3 Cage:
Distributor/Vendor # 4:
Distributor/Vendor # 4 Cage:
Safety Data Action Code: A
Safety Focal Point: A
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SE
Date MSDS Prepared: 04SEP92
Safety Data Review Date: 05JAN93
Supply Item Manager:
MSDS Preparer's Name:
Preparer's Company:
Preparer's St Or P. O. Box:
Preparer's City:
Preparer's State:
Preparer's Zip Code:
Other MSDS Number:
MSDS Serial Number: BPZSJ
Specification Number:
Spec Type, Grade, Class:
Hazard Characteristic Code: NK
Unit Of Issue: EA
Unit Of Issue Container Qty:
Type Of Container:
Net Unit Weight:
NRC/State License Number: N/R
Net Explosive Weight:
Net Propellant Weight-Ammo: N/R
Coast Guard Ammunition Code:

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Ingredients/Identity Information
==========
Proprietary: NO
Ingredient: CALCIUM, METAL.TOTAL PERCENT OF INGREDIENTS 1 & 2 IS <10.
Ingredient Sequence Number: 01
Percent: N/K
Ingredient Action Code: A
Ingredient Focal Point: A
NIOSH (RTECS) Number: EV8040000
CAS Number: 7440-70-2
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: CALCIUM CHROMATE (SARA III).TOTAL % OF ING 1 & 2 IS <10.OSHA PEL FOR CHROMIC ACID & CHROMATES.
Ingredient Sequence Number: 02
Percent: N/K
Ingredient Action Code: A
Ingredient Focal Point: A
NIOSH (RTECS) Number: GB2750000
CAS Number: 13765-19-0
OSHA PEL: 0.1 MG(CRO3)/M3,CEIL
ACGIH TLV: 0.001 MG/M3
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: POTASSIUM PERCHLORATE
Ingredient Sequence Number: 03
Percent: <10
Ingredient Action Code: A
Ingredient Focal Point: A
NIOSH (RTECS) Number: SC9700000
CAS Number: 7778-74-7
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: ASBESTOS (FRIABLE) (SARA III)
Ingredient Sequence Number: 04
Percent: <1
Ingredient Action Code: A
Ingredient Focal Point: A
NIOSH (RTECS) Number: CI6425000
CAS Number: 1332-21-4
OSHA PEL: 0.2 FIBER/CC
ACGIH TLV: 0.2 FIBER/CC,INT CHG
Other Recommended Limit: NONE RECOMMENDED
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Physical/Chemical Characteristics
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Appearance And Odor: NOT KNOWN
Boiling Point: NOT KNOWN
Melting Point: NOT KNOWN

Vapor Pressure (MM Hg/70 F): NOT KNOWN
Vapor Density (Air=1): NOT KNOWN
Specific Gravity: NOT KNOWN
Decomposition Temperature: NOT KNOWN
Evaporation Rate And Ref: NOT KNOWN
Solubility In Water: NOT KNOWN
Percent Volatiles By Volume: N/K
Viscosity:
pH: N/K
Radioactivity:
Form (Radioactive Matl):
Magnetism (Milligauss):
Corrosion Rate (IPY): N/K
Autoignition Temperature:

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Fire and Explosion Hazard Data

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Flash Point: NOT KNOWN
Flash Point Method: N/K
Lower Explosive Limit: NOT KNOWN
Upper Explosive Limit: NOT KNOWN
Extinguishing Media: USE CARBON DIOXIDE OR DRY CHEMICAL FIRE EXTINGUISHER, 10-B:C.
Special Fire Fighting Proc: FIRE FIGHTERS SHOULD USE SELF-CONTAINED BREATHING APPARATUS (SCBA).
Unusual Fire And Expl Hazrds: BATTERY/CELLS MAY RUPTURE AND/OR RELEASE TOXIC FUMES,IF SUBJECTED TO EXTREME HEAT.FIRE MAY CAUSE BATTERIES TO FUME.

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Reactivity Data

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Stability: YES
Cond To Avoid (Stability): FIRE AND EXTREME HEAT.
Materials To Avoid: STORE SEPARATELY FROM OTHER HAZARDOUS MATERIALS.
Hazardous Decomp Products: WHEN EXPOSED TO FIRE OR EXTREME HEAT, BATTERIES MAY EMIT TOXIC FUMES.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): WILL NOT OCCUR.

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Health Hazard Data

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LD50-LC50 Mixture: NOT KNOWN
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: INTACT BATTERIES PRESENT NO SPECIFIC HAZARDS.BURNING BATTERIES MAY EMIT TOXIC FUMES.
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: YES
Explanation Carcinogenicity: ASBESTOS:KNOWN HUMAN CARCIN (OSHA,1985 & NTP,1991).ACGIH A1=KNOWN HUMAN CARCIN (1993).KNOWN TO CAUSE CANCER (SEE SUPP)
Signs/Symptoms Of Overexp: EXPOSURE TO LEAKING BATTERY MATERIAL MAY CAUSE SEVERE IRRITATION TO EYES,SKIN,MUCOUS MEMBRANES.INHALATION OF FUMES OF BURNING BATTERIES MAY CAUSE SEVERE RESPIRATORY IRRITATION.
Med Cond Aggravated By Exp: BURNING BATTERIES:RESPIRATORY AILMENTS. LEAKING BATTERIES:SKIN CONDITIONS.

Emergency/First Aid Proc: BATTERY CONTENTS IN CONTACT WITH EYES/SKIN: WASH AFFECTED AREA WITH CLEAN WATER FOR AT LEAST 15 MINUTES.DO NOT ATTEMPT TO NEUTRALIZE.SEEK MEDICAL ATTENTION PROMPTLY.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: AVOID SKIN OR EYE CONTACT.USE NONFLAMMABLE ABSORBENT FOR CLEANUP.COORDINATE WITH INSTALLATION SAFETY AND ENVIRONMENTAL OFFICES.

Neutralizing Agent: NOT KNOWN

Waste Disposal Method: DISP MUST BE IAW FEDERAL,STATE,AND LOCAL REGULATIONS.COORDINATE WITH SUPPORTING INSTALLATION AND/OR MACOM ENVIRONMENTAL OFFICE PRIOR TO DISPOSAL (FP A).THERMAL BATTERIES CLASSIFIED AS HAZARDOUS WASTE UNDER RCRA,DISP SHOULD BE THROUGH DRMO.

Precautions-Handling/Storing: DO NOT ABUSE OR SHORT CIRCUIT.WHEN STORING, STORE IN COOL,DRY AND WELL VENTILATED AREA,WHICH IS APPROVED BY LOCAL FIRE DEPARTMENT.

Other Precautions: BATTERY MUST BE FIRED BEFORE DISPOSITION.WHEN ACTIVATED,BATTERY SURFACE TEMPERATURES CAN EXCEED 500 F.DO NOT ATTEMPT TO RECHARGE.

Control Measures

Respiratory Protection: IF BATTERIES ARE BURNING USE SELF-CONTAINED BREATHING APPARATUS (SCBA).

Ventilation: SELF-CONTAINED BREATHING APPARATUS.

Protective Gloves: CHEMICAL & THERMAL RESISTANT GLOVES.

Eye Protection: CHEMICAL SAFETY GOGGLES (FP A).

Other Protective Equipment: NOT KNOWN

Work Hygienic Practices: WHEN DEACTIVATING THERMAL CHARGE OF BATTERY,PLACE BATTERY ON HEAT/FIRE RESISTANT SURFACE.

Suppl. Safety & Health Data: EXPLAN OF CARCIN:(CAL PROP 65,1987).SUFF EVID FOR CARCIN IN HUMAN AND ANIMALS (IARC,1987).CALCIUM CHROMATE:ACGIH A2= SUSPECTED HUM CARCIN (1993).CR(VI) CMPD:SUFF EVID FOR CARCIN IN HUM & ANIMALS (IARC,1987).CR & CERTAIN CR CMPD:KNOWN HUM CARCIN (NTP,1991).CR(VI) :KNOWN TO CAUSE CANCER (CAL PROP 65,1987).

DOD Hazardous Materials Information System
DoD 6050.5-L
AS OF May 1993

FSC: 6140
NIIN: 001955344
Manufacturer's CAGE: 14309
Part No. Indicator: A
Part Number/Trade Name: LEAD/ACID STORAGE BATTERY,STORAGE (SEE SUP)

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General Information

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Item Name:
Manufacturer's Name: ATLANTIC BATTERY CO
Manufacturer's Street: 80 ELM ST
Manufacturer's P. O. Box:
Manufacturer's City: WATERTOWN
Manufacturer's State: MA
Manufacturer's Country: US
Manufacturer's Zip Code: 02172
Manufacturer's Emerg Ph #: 617-924-2868
Manufacturer's Info Ph #: 617-924-2868
Distributor/Vendor # 1:
Distributor/Vendor # 1 Cage:
Distributor/Vendor # 2:
Distributor/Vendor # 2 Cage:
Distributor/Vendor # 3:
Distributor/Vendor # 3 Cage:
Distributor/Vendor # 4:
Distributor/Vendor # 4 Cage:
Safety Data Action Code:
Safety Focal Point: A
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: A
Date MSDS Prepared:
Safety Data Review Date: 05FEB90
Supply Item Manager:
MSDS Preparer's Name:
Preparer's Company:
Preparer's St Or P. O. Box:
Preparer's City:
Preparer's State:
Preparer's Zip Code:
Other MSDS Number:
MSDS Serial Number: BJJNN
Specification Number:
Spec Type, Grade, Class:
Hazard Characteristic Code:
Unit Of Issue: EA *
Unit Of Issue Container Qty:
Type Of Container:
Net Unit Weight:
NRC/State License Number:
Net Explosive Weight:
Net Propellant Weight-Ammo:
Coast Guard Ammunition Code:

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Ingredients/Identity Information
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Proprietary: NO
Ingredient: ARSENIC (SARA III)
Ingredient Sequence Number: 01
Percent: <1
Ingredient Action Code:
Ingredient Focal Point: A
NIOSH (RTECS) Number: CG0525000
CAS Number: 7440-38-2
OSHA PEL: 0.01 MG/M3 (AS)
ACGIH TLV: 0.2 MG/M3; 9192
Other Recommended Limit: N/K (FP A/ORNL)

Proprietary: NO
Ingredient: LEAD (SARA III)
Ingredient Sequence Number: 02
Percent: <60
Ingredient Action Code:
Ingredient Focal Point: A
NIOSH (RTECS) Number: OF7525000
CAS Number: 7439-92-1
OSHA PEL: 0.05 MG/M3;1910.1025
ACGIH TLV: 0.15 MG/M3;DUST 9192
Other Recommended Limit: N/K (FP A/ORNL)

Proprietary: NO
Ingredient: ANTIMONY (SARA III)
Ingredient Sequence Number: 03
Percent: 1-5
Ingredient Action Code:
Ingredient Focal Point: A
NIOSH (RTECS) Number: CC4025000
CAS Number: 7440-36-0
OSHA PEL: 0.5 MG/M3
ACGIH TLV: 0.5 MG SB/M3; 9192
Other Recommended Limit: N/K (FP A/ORNL)

Proprietary: NO
Ingredient: SULFURIC ACID (SARA III)
Ingredient Sequence Number: 04
Percent: 10-30
Ingredient Action Code:
Ingredient Focal Point: A
NIOSH (RTECS) Number: WS5600000
CAS Number: 7664-93-9
OSHA PEL: 1 MG/M3
ACGIH TLV: 1 MG/M3; 9192
Other Recommended Limit: N/K (FP A/ORNL)

Proprietary: NO
Ingredient: LEAD OXIDE.INGREDIENTS 2,5,& 6 MAKE UP 60% OF PRODUCT.ACGIH TLV IS FOR INORGANIC DUST & FUMES.
Ingredient Sequence Number: 05
Percent: <60
Ingredient Action Code:

Ingredient Focal Point: A
NIOSH (RTECS) Number: 1002180OL
CAS Number: N/K (FP A)
OSHA PEL: 0.05 MG(PB)/M3
ACGIH TLV: 0.15 MG(PB)/M3
Other Recommended Limit: N/K (FP A/ORNL)

Proprietary: NO
Ingredient: LEAD SULFATE (SARA III)
Ingredient Sequence Number: 06
Percent: <60
Ingredient Action Code:
Ingredient Focal Point: A
NIOSH (RTECS) Number: OG4375000
CAS Number: 7446-14-2
OSHA PEL: SEE 1910.1025
ACGIH TLV: 0.15 MG PB/M3; 9192
Other Recommended Limit: N/K (FP A/ORNL)

Physical/Chemical Characteristics

Appearance And Odor: NONE
Boiling Point: N/A
Melting Point: N/K (FP A)
Vapor Pressure (MM Hg/70 F): N/K (FP A)
Vapor Density (Air=1): <1 (AIR=1)
Specific Gravity: N/K (FP A)
Decomposition Temperature: N/K (FP A)
Evaporation Rate And Ref: N/A
Solubility In Water: NONE
Percent Volatiles By Volume: N/A
Viscosity:
pH: N/K
Radioactivity:
Form (Radioactive Matl):
Magnetism (Milligauss):
Corrosion Rate (IPY): N/K
Autoignition Temperature: N/A *

Fire and Explosion Hazard Data

Flash Point: N/A
Flash Point Method: N/K
Lower Explosive Limit: 74.2
Upper Explosive Limit: 4.0
Extinguishing Media: HALON,DRY CHEMICAL.
Special Fire Fighting Proc: HALON OR DRY CHEMICAL.
Unusual Fire And Expl Hazrds: HYDROGEN GAS & H*2SO*4 VAP GENERATED UPON OVERCHARGE.VENT CHARGING AREAS PER ACGIH INDUS VENT A MANUAL OF REC PRACTICE & NATL FIRE CODE,1980 VOL 1,P 12,B-9,10.

Reactivity Data

Stability: N/K
Cond To Avoid (Stability): AVOID OVERCHARGING AND SMOKING,SPARKS OR OPEN FLAME NEAR BATTERY SURFACE.
Materials To Avoid: N/K (FP A/ORNL)

Hazardous Decomp Products: AN EXPLOSIVE HYDROGEN/OXYGEN MIXTURE WITHIN THE BATTERY MAY OCCUR DURING CHARGING.
Hazardous Poly Occur: N/K
Conditions To Avoid (Poly): N/K (FP A/ORNL)

Health Hazard Data

LD50-LC50 Mixture: N/K (FP A/ORNL)
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: LEAD:KNOWN TO CAUSE REPRODUCTIVE DISORDERS (FEMALE,MALE AND/OR DEVELOPMENTAL)(CAL PROP 65,1987).NO POSSIBILITY OF OVEREXPOSURE TO LEAD,ETC UNLESS BATTERY IS DESTROYED.SULFURIC ACID MIST WILL BURN EYES & SKIN.
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: YES
Explanation Carcinogenicity: INORGANIC LEAD & LEAD CMPDS:INADEQ EVID FOR CARC IN HUM;SUFF EVID FOR CARC IN ANIM (IARC,1987).ARSENIC:KNOWN (SEE SUPP)
Signs/Symptoms Of Overexp: NO POSSIBILITY OF OVEREXPOSURE TO LEAD,ETC UNLESS BATTERY IS DESTROYED.EYES/SKIN:SULFURIC ACID MIST WILL BURN EYES & SKIN.INGESTION:N/K (FP A/ORNL).INHALATION:SULFURIC ACID MIST CAUSES COUGHING.
Med Cond Aggravated By Exp: N/K (FP A/ORNL)
Emergency/First Aid Proc: EYES:WASH WITH COPIOUS QUANTITIES OF RUNNING WATER FOR 15 MINUTES.SKIN:FLUSH AREA WITH PLENTIFUL AMOUNTS OF RUNNING WATER.INGESTION:WASH OUT MOUTH WITH RUNNING WATER.GIVE MILK TO DRINK.DO NOT INDUCE VOMITING.CALL PHYSICIAN.INHALATION:MOVE TO VENTILATED AREA.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: WASH WITH WATER OR NEUTRALIZE WITH SODIUM CARBONATE OR BICARBONATE.
Neutralizing Agent: SODIUM CARBONATE OR BICARBONATE.
Waste Disposal Method: DISPOSAL MUST BE IN ACCORDANCE WITH FEDERAL,STATE AND LOCAL REGULATIONS.COORDINATION WITH SUPPORTING INSTALLATION/MACOM ENVIRONMENTAL COORDINATION PRIOR TO DISPOSAL IS REC TO DETERM APPROP DISP METH (FP A).NEUT WITH SODIUM CARBONATE OR BICARBONATE.
Precautions-Handling/Storing: KEEP AWAY FROM FLAMES DURING AND IMMEDIATELY AFTER CHARGE.TOXIC MATERIAL.CORROSIVE MATERIAL.
Other Precautions: AVOID PROLONGED OVERCHARGE.

Control Measures

Respiratory Protection: SULFURIC ACID MIST-HALF MASK WITH DUST AND ACID MIST FILTER.
Ventilation: CHANGE AIR EVERY 15 MINUTES.
Protective Gloves: RUBBER
Eye Protection: GOGGLES OR FACESHIELD.
Other Protective Equipment: RUBBER OR PLASTIC APRON.
Work Hygienic Practices: N/K (FP A/ORNL)
Suppl. Safety & Health Data: PART NO:BATTERY CONSOL.REACTIVITY IN WATER: NONE.EXPLAN OF CARC:CARCINOGEN (NTP,1989).SUFF EVID FOR CARC IN HUM;LIMITED EVID FOR CARC IN ANIM (IARC,1987).KNOWN HUMAN CARCINOGEN (OSHA,1985),KNOWN TO CAUSE CANCER (CAL PROP 65,1987).ROUTES OF ENTRY:INHALATION/SKIN/ INGESTION (FP A).

DOD Hazardous Materials Information System
DoD 6050.5-L
AS OF May 1993

FSC: 6810
NIIN: 00N019123
Manufacturer's CAGE: 54968
Part No. Indicator: A
Part Number/Trade Name: BASE-NEUTRAL 2, 1ML METHYLENE CHLORIDE, 488

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General Information

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Item Name:
Manufacturer's Name: SUPELCO INC
Manufacturer's Street: SUPELCO PARK
Manufacturer's P. O. Box:
Manufacturer's City: BELLEFONTE
Manufacturer's State: PA
Manufacturer's Country: US
Manufacturer's Zip Code: 16823-0048
Manufacturer's Emerg Ph #: 814-359-3441
Manufacturer's Info Ph #: 814-359-3441
Distributor/Vendor # 1:
Distributor/Vendor # 1 Cage:
Distributor/Vendor # 2:
Distributor/Vendor # 2 Cage:
Distributor/Vendor # 3:
Distributor/Vendor # 3 Cage:
Distributor/Vendor # 4:
Distributor/Vendor # 4 Cage:
Safety Data Action Code:
Safety Focal Point: N
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SMJ
Date MSDS Prepared: 29FEB88
Safety Data Review Date: 25SEP91
Supply Item Manager:
MSDS Preparer's Name:
Preparer's Company:
Preparer's St Or P. O. Box:
Preparer's City:
Preparer's State:
Preparer's Zip Code:
Other MSDS Number:
MSDS Serial Number: BLDTF
Specification Number:
Spec Type, Grade, Class:
Hazard Characteristic Code: N/
Unit Of Issue:
Unit Of Issue Container Qty:
Type Of Container:
Net Unit Weight:
NRC/State License Number:
Net Explosive Weight:
Net Propellant Weight-Ammo:
Coast Guard Ammunition Code:

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Ingredients/Identity Information
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Proprietary: NO
Ingredient: ANTHRACENE (SARA III)
Ingredient Sequence Number: 01
Percent: 0.02
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: CA9350000
CAS Number: 120-12-7
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: NAPHTHALENE (SARA III)
Ingredient Sequence Number: 02
Percent: 0.02
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: QJ0525000
CAS Number: 91-20-3
OSHA PEL: 10 PPM/15 STEL
ACGIH TLV: 10 PPM/15 STEL; 9192
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: ACENAPHTHENE (SARA III)
Ingredient Sequence Number: 03
Percent: 0.02
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: AB1000000
CAS Number: 83-32-9
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: HEXACHLOROBENZENE (SARA III)
Ingredient Sequence Number: 04
Percent: 0.02
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: DA2975000
CAS Number: 118-74-1
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: O-DICHLOROBENZENE (SARA III)
Ingredient Sequence Number: 05
Percent: 0.02
Ingredient Action Code:
Ingredient Focal Point: N

NIOSH (RTECS) Number: CZ4500000
CAS Number: 95-50-1
OSHA PEL: S, 25 PPM; 9293
ACGIH TLV: C, 50 PPM
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: P-DICHLOROBENZENE (1,3-DICHLOROBENZENE) (SEE LIMITS FOR 0- & P- DICHLOROBENZENES) (SARA III)
Ingredient Sequence Number: 06
Percent: 0.02
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: CZ4499000
CAS Number: 541-73-1
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: 2,4-DINITROTOLUENE (SEE LIMITS FOR MIXED ISOMERS CAS 25321-14-6) (SARA III)
Ingredient Sequence Number: 07
Percent: 0.02
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: XT1575000
CAS Number: 121-14-2
OSHA PEL: 1.5 MG/M3;SKIN
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: BIS(2-CHLOROETHOXY) METHANE (SARA III)
Ingredient Sequence Number: 08
Percent: 0.02
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: PA3675000
CAS Number: 111-91-1
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: HEXACHLOROBUTADIENE (SARA III)
Ingredient Sequence Number: 09
Percent: 0.02
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: EJ0700000
CAS Number: 87-68-3
OSHA PEL: 0.02 PPM
ACGIH TLV: S,0.02 PPM, A2; 9192
Other Recommended Limit: N/K

Proprietary: NO

Ingredient: DIETHYL PHTHALATE (SARA III)
Ingredient Sequence Number: 10
Percent: 0.02
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: TI1050000
CAS Number: 84-66-2
OSHA PEL: 5 MG/M3
ACGIH TLV: 5 MG/M3; 9192
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: BENZ~A|ANTHRACENE (SARA III)
Ingredient Sequence Number: 11
Percent: 0.02
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: CV9275000
CAS Number: 56-55-3
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: CHRYSENE (LIMIT FROM COAL TAR PITCH VOLITILES) (SARA III)
Ingredient Sequence Number: 12
Percent: 0.02
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: GC0700000
CAS Number: 218-01-9
OSHA PEL: 0.2 PPM
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: PYRENE (SARA III)
Ingredient Sequence Number: 13
Percent: 0.02
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: UR2450000
CAS Number: 129-00-0
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: FLUORENE (SARA III)
Ingredient Sequence Number: 14
Percent: 0.02
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: LL5670000
CAS Number: 86-73-7
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED

Other Recommended Limit: N/K

Proprietary: NO
Ingredient: DIBENZO(A,H)ANTHRACENE
Ingredient Sequence Number: 15
Percent: 0.02
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: NH2625000
CAS Number: 53-70-3
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: METHYLENE CHLORIDE (SARA III)
Ingredient Sequence Number: 16
Percent: 99.7
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: PA8050000
CAS Number: 75-09-2
OSHA PEL: 500 PPM/C,1000; Z2
ACGIH TLV: 50 PPM, A2; 9192
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: SUPP DATA:MAY BE CONTRAINDICATED EXCEPT FOR LIFE-SUSTAINING
USES IN HUMANS ACUTELY/CHRONICALLY EXPOSED TO (INGRED 18)
Ingredient Sequence Number: 17
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: 9999999ZZ
CAS Number: N/K
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: ING 17:CHLOROCARBONS (FP N).
Ingredient Sequence Number: 18
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: 9999999ZZ
CAS Number: N/K
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: FIRST AID PROC:SENSITIVITY OF HEART TO ADRENALIN MAY BE CAUSED
BY OVEREXPOSURE TO CH*2CL*2.
Ingredient Sequence Number: 19
Percent: N/K
Ingredient Action Code:

Ingredient Focal Point: N
NIOSH (RTECS) Number: 9999999ZZ
CAS Number: N/K
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: CARCIN.EXP:BUT IN CONCENTRATIONS LESS THAN THE MINIMUM REPORTABLE AMOUNTS.
Ingredient Sequence Number: 20
Percent:
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: 9999999ZZ
CAS Number:
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE
Other Recommended Limit: NONE SPECIFIED

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Physical/Chemical Characteristics

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Appearance And Odor: CLEAR, COLORLESS LIQUID; ETHER-LIKE ODOR.
Boiling Point: 104F,40C
Melting Point: -143F,-97C
Vapor Pressure (MM Hg/70 F): 349 @ 20C
Vapor Density (Air=1): 2.93 @ 20C
Specific Gravity: 1.320
Decomposition Temperature: N/K
Evaporation Rate And Ref: 0.71 (ETHER=1)
Solubility In Water: 2%
Percent Volatiles By Volume: 100
Viscosity:
pH: N/K
Radioactivity:
Form (Radioactive Matl):
Magnetism (Milligauss):
Corrosion Rate (IPY): N/K
Autoignition Temperature:

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Fire and Explosion Hazard Data

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Flash Point: N/K
Flash Point Method: N/K
Lower Explosive Limit: 12%
Upper Explosive Limit: 19%
Extinguishing Media: WATER, CO*2, DRY CHEMICAL.
Special Fire Fighting Proc: WEAR NIOSH/MSHA APPROVED PRESSURE DEMAND SCBA & FULL PROTECTIVE EQUIPMENT (FP N).
Unusual Fire And Expl Hazrds: THE FOLLOWING TOX VAPS ARE FORMED WHEN MATL IS HEATED TO DECOMP:HYDROGEN CHLORIDE & PHOSGENE.

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Reactivity Data

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Stability: YES
Cond To Avoid (Stability): LIQ O*2/OTHER STRONG OXIDANTS MAY FORM EXPLO MIXT W/METHYLENE CHLORIDE. MATL/ITS VAPS WHEN IN CNTCT W/FLAMES, (SUPDAT)

Materials To Avoid: STRONG BASES & OXIDIZING AGENTS.
Hazardous Decomp Products: HYDROGEN CHLORIDE & PHOSGENE.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT.

Health Hazard Data

LD50-LC50 Mixture: SEE INGREDIENTS.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: MAY BE FATAL IF INHALED. HARMFUL IF SWALLOWED. CAUSES TEARING. SKIN IRRIT. DERM, HDCH, DIZZ, NARCOS, LIVER/ KIDNEY DMG. SEVERAL CHRONIC INHAL STUDIES REVEALED THAT TEST ANIMALS EXPOS TO METHYLENE CHLORIDE CONC AS HIGH AS 10,000 PPM SHOWED SLIGHT LIVER & KIDNEY CHANGES. METHYLENE CHLORIDE HAS BEEN SHOWN (EFTS OF OVEREXP)
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: METHYLENE CHLORIDE:CLASS 2(NTP); GROUP 2B(IARC).CONTAINS OTHER MATERIAL CONSIDERED CARCINOGENIC (SEE ING 20).
Signs/Symptoms Of Overexp: HLTH HAZ:TO INCR RATE OF SPONT OCCURING MALIGNANT TUMORS IN ONE STRAIN OF LAB MICE & BENIGN TUMORS IN LAB RATS. IN RATS METHYLENE CHLORIDE HAS BEEN SHOWN TO PRDCE STATISTICALLY SIGNIFICANT INCR IN SALIVARY GLAND TUMORS. RESEARCH HAS RECENTLY SHOWN THAT CH*2CL*2 IS METABOLIZED BY BODY TO CO & CAN STRESS CVS THRU(SUPDAT)
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: EYES:FLUSH W/H*20 FOR @ LST 15 MIN. SKIN: PROMPTLY WASH W/MILD SOAP & LG VOLS OF H*20. REMOVE CONTAM CLTHG. INHAL: IMMED MOVE TO FRESH AIR. GIVE O*2 IF BRTHG IS LABOREED. IF BRTHG STOPS, GIVE ARTF RESP. CALL MD. INGEST:NEVER GIVE ANYTHING BY MOUTH TO UNCON PERS. NEVER TRY TO MAKE UNCON PERS VOMIT. DO NOT INDUCE VOMIT. IMMED CALL MD. NEVER ADMIN ADRENALIN FOLLOWING CH*2CL*2 OVEREXP. INCR (INGRED 18)

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: TAKE UP WITH ABSORBENT MATERIAL. VENTILATE AREA.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: DISPOSE OF I/A/W FEDERAL, STATE & LOCAL REGULATIONS (FP N).
Precautions-Handling/Storing: REFRIGERATE IN SEALED CONTAINER. METHYLENE CHLORIDE VAPORS ARE HEAVIER THAN AIR & WILL COLLECT IN LOW AREAS.
Other Precautions: POSSIBLE CANCER HAZARD. AVOID EYE/SKIN CONTACT. AVOID BRTHG VAPORS. NO SMOKING IN AREA OF USE. DO NOT USE IN GEN VICIN OF ARC WELDING, OPEN FLAMES/HOT SURF. HEAT &/OR UV RADIA MAY CAUSE FORM OF HCL &/ OR PHOSGENE (FP N).

Control Measures

Respiratory Protection: WEAR NIOSH/MSHA APPROVED FACE MASK W/ORGANIC VAPOR CANISTER. WEAR NIOSH/MSHA APPROVED RESPIRATORY PROTECTION.
Ventilation: USE ONLY IN WELL VENTILATED AREA.
Protective Gloves: WEAR NEOPRENE GLOVES.
Eye Protection: CHEMICAL WORKERS GOGGLES (FP N).
Other Protective Equipment: NOT APPLICABLE
Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER.

Suppl. Safety & Health Data: CNDTNS (STAB):HOT GLOWING SURF/ELEC ARCS CAN DECOMP TO FORM HYDROGEN CHLORIDE GAS & TRACES OF PHOSGENE. EFTS OF OVEREXP: ELEVATION OF LEVEL OF CARBOXYHEMOGLOBIN. CHLOROCARBON MATLS HAVE PRDCED SENSIT OF MYOCARDIUM TO EPINEPHRINE IN LAB ANIMALS & COULD HAVE SIMILAR EFT IN HUMANS. ADRENOMIMETICS (EG, EPINEPHRINE) (ING 17)

DOD Hazardous Materials Information System
DoD 6050.5-L
AS OF May 1993

FSC: 4530
NIIN: 00F025659
Manufacturer's CAGE: UNISO
Part No. Indicator: A
Part Number/Trade Name: POLYCHLORINATED BIPHENYLS

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General Information

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Item Name:
Manufacturer's Name: UNISON TRANSFORMER SERVICES INC
Manufacturer's Street: 1338 HUNDRED OAKS DRIVE
Manufacturer's P. O. Box: N/K
Manufacturer's City: CHARLOTTE
Manufacturer's State: NC
Manufacturer's Country: US
Manufacturer's Zip Code: 28217
Manufacturer's Emerg Ph #: 800-544-0030
Manufacturer's Info Ph #: 800-544-0030
Distributor/Vendor # 1:
Distributor/Vendor # 1 Cage:
Distributor/Vendor # 2:
Distributor/Vendor # 2 Cage:
Distributor/Vendor # 3:
Distributor/Vendor # 3 Cage:
Distributor/Vendor # 4:
Distributor/Vendor # 4 Cage:
Safety Data Action Code:
Safety Focal Point: F
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SE
Date MSDS Prepared: 15OCT87
Safety Data Review Date: 08DEC92
Supply Item Manager:
MSDS Preparer's Name:
Preparer's Company: UNISON TRANSFORMER SERVICES INC
Preparer's St Or P. O. Box: 1338 HUNDRED OAKS DRIVE
Preparer's City: CHARLOTTE
Preparer's State: NC
Preparer's Zip Code: 28217
Other MSDS Number:
MSDS Serial Number: BPSMG
Specification Number:
Spec Type, Grade, Class:
Hazard Characteristic Code:
Unit Of Issue:
Unit Of Issue Container Qty:
Type Of Container:
Net Unit Weight:
NRC/State License Number:
Net Explosive Weight:
Net Propellant Weight-Ammo:
Coast Guard Ammunition Code:

Ingredients/Identity Information

Proprietary: NO
Ingredient: PCB-POLYCHLORINATED BIPHENYLS (ANIMAL & SUSPECTED HUMAN CARCINOGEN BY NTP, IARC & ACGIH)
Ingredient Sequence Number: 01
Percent: 100%
Ingredient Action Code:
Ingredient Focal Point: F
NIOSH (RTECS) Number: TQ1350000
CAS Number: 1336-36-3
OSHA PEL: N/K
ACGIH TLV: N/K
Other Recommended Limit: 1 MG/CUM

Physical/Chemical Characteristics

Appearance And Odor: CLEAR, NEARLY COLORLESS LIQUID, SLIGHT AROMATIC ODOR.
Boiling Point: >325C
Melting Point: <10C
Vapor Pressure (MM Hg/70 F): <1
Vapor Density (Air=1): >1
Specific Gravity: 1.38
Decomposition Temperature: N/K
Evaporation Rate And Ref: (BU AC = 1): <1
Solubility In Water: INSOLUBLE
Percent Volatiles By Volume: N/K
Viscosity:
pH: N/K
Radioactivity:
Form (Radioactive Matl):
Magnetism (Milligauss):
Corrosion Rate (IPY): N/K
Autoignition Temperature:

Fire and Explosion Hazard Data

Flash Point: >350F
Flash Point Method: PMCC
Lower Explosive Limit: N/K
Upper Explosive Limit: N/K
Extinguishing Media: WATER SPRAY, CO2, DRY CHEMICAL, ALCOHOL-TYPE OR UNIVERSAL-TYPE FOAMS APPLIED BY MANUFACTURER'S RECOMMENDED TECHNIQUE.
Special Fire Fighting Proc: WEAR SELF-CONTAINED BREATHING APPARATUS & STANDARD FIRE-FIGHTER WEARING APPAREL: TOXIC & IRRITATING VAPORS CAN BE EVOLVED.
Unusual Fire And Expl Hazrds: N/K

Reactivity Data

Stability: YES
Cond To Avoid (Stability): TEMPERATURES >300F, OPEN FLAME & ELECTRIC ARC
Materials To Avoid: OXIDIZING AGENTS
Hazardous Decomp Products: CO, CO2, & HYDROGEN CHLORIDE. UNDER HIGH TEMPERATURE CONDITIONS, PCBS CAN OXIDIZE TO PRODUCE DIOXINS & DIBENZOFURANS.

Hazardous Poly Occur: NO
Conditions To Avoid (Poly): N/K

Health Hazard Data

LD50-LC50 Mixture: N/K
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: INGESTION: THROAT IRRITATION. LETHARGY, NAUSEA & VOMITING & HARMFUL. SKIN: MODERATELY TOXIC, IRRITATION. INHALATION: NOSE, THROAT & LUNG IRRITATION. HARMFUL. EYES: MINOR TO SEVERE IRRITATION.
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: SEE INGREDIENT
Signs/Symptoms Of Overexp: INGESTION: LIVER INJURY. SKIN: CHLORACNE, LESIONS & SENSITIZATION. ABSORPTION OF POTENTIALLY HARMFUL AMOUNTS OF MATERIAL.
Med Cond Aggravated By Exp: N/K
Emergency/First Aid Proc: INGESTION: GIVE TWO GLASSES OF WATER & INDUCE VOMITING. SKIN: WIPE EXCESS MATERIAL FROM SKIN. WASH THOROUGHLY W/ SOAP & WATER. INHALATION: REMOVE TO FRESH AIR. EYES: WASH W/WATER FOR AT LEAST 15 MINS. OBTAIN MEDICAL ATTENTION IN ALL CASES.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: COLLECT SPILLS W/ABSORBENT SOLIDS OR CONTAIN & PUMP TO DRUMS FOR DISPOSAL. IF FROZEN, SHOVEL INTO DRUMS.
Neutralizing Agent: N/K
Waste Disposal Method: INCINERATE IN FACILITIES DESIGNED TO HANDLE HALOGENATED EMISSIONS GASES & APPROVED FOR PCB WASTE WHICH ARE OPERATED IN ACCORDANCE W/FEDERAL, STATE & LOCAL REGULATIONS.
Precautions-Handling/Storing: AVOID TEMPERATURES >300F. KEEP CONTAINER CLOSED. USE W/ADEQUATE VENTILATION.
Other Precautions: AVOID CONTACT W/SKIN, EYES, & CLOTHING. AVOID BREATHING VAPORS. DON'T SWALLOW. FOR INDUSTRIAL USE ONLY.

Control Measures

Respiratory Protection: FULL FACE OR HALF FACE RESPIRATOR W/ORGANIC CANISTER.
Ventilation: GENERAL (MECHANICAL) ROOM VENTILATION IS EXPECTED TO BE SATISFACTORY.
Protective Gloves: VITON, MILLED NITRILE OR MILLED NEOPRENE
Eye Protection: MONOGOGGLES
Other Protective Equipment: SHOWER, EYEBATH. SARANEX LAMINATED TYVEK CLOTHING AS APPROPRIATE.
Work Hygienic Practices: REMOVE & WASH CONTAMINATED CLOTHES BEFORE REUSE. WASH THOROUGHLY AFTER HANDLING.
Suppl. Safety & Health Data: NOTE TO PHYSICIAN: THERE IS NO SPECIFIC ANTIDOTE. TREATMENT OF OVEREXPOSURE SHOULD BE DIRECTED TO THE CONTROL OF SYMPTOMS & THE CLINICAL CONDITION.

DOD Hazardous Materials Information System
DoD 6050.5-L
AS OF May 1993

FSC: 9150
NIIN: 00B010043
Manufacturer's CAGE: 15958
Part No. Indicator: A
Part Number/Trade Name: REGULAR GASOLINE

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General Information

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Item Name: N/K
Manufacturer's Name: AMOCO OIL COMPANY
Manufacturer's Street: 200 EAST RANDOLPH DRIVE
Manufacturer's P. O. Box:
Manufacturer's City: CHICAGO
Manufacturer's State: IL
Manufacturer's Country: US
Manufacturer's Zip Code: 60601
Manufacturer's Emerg Ph #: 800 447-8735
Manufacturer's Info Ph #: 312 856-3907
Distributor/Vendor # 1: N/K
Distributor/Vendor # 1 Cage: N/K
Distributor/Vendor # 2: N/K
Distributor/Vendor # 2 Cage: N/K
Distributor/Vendor # 3: N/K
Distributor/Vendor # 3 Cage: N/K
Distributor/Vendor # 4: N/K
Distributor/Vendor # 4 Cage: N/K
Safety Data Action Code:
Safety Focal Point: B
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: N/K
Date MSDS Prepared:
Safety Data Review Date: 05FEB88
Supply Item Manager: N/K
MSDS Preparer's Name: N/K
Preparer's Company: N/K
Preparer's St Or P. O. Box: N/K
Preparer's City: N/K
Preparer's State:
Preparer's Zip Code: N/K
Other MSDS Number:
MSDS Serial Number: BBBDC
Specification Number: N/K
Spec Type, Grade, Class: N/K
Hazard Characteristic Code:
Unit Of Issue:
Unit Of Issue Container Qty:
Type Of Container:
Net Unit Weight:
NRC/State License Number: N/K
Net Explosive Weight:
Net Propellant Weight-Ammo: N/K
Coast Guard Ammunition Code:

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Ingredients/Identity Information
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Proprietary: NO
Ingredient: BENZENE (SARA III)
Ingredient Sequence Number: 01
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: B
NIOSH (RTECS) Number: CY1400000
CAS Number: 71-43-2
OSHA PEL: 1PPM/5STEL;1910.1028
ACGIH TLV: 10 PPM; A2; 9192
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: XYLENES (O-,M-,P- ISOMERS) (SARA III)
Ingredient Sequence Number: 02
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: B
NIOSH (RTECS) Number: ZE2100000
CAS Number: 1330-20-7
OSHA PEL: 100 PPM/150 STEL
ACGIH TLV: 100 PPM/150STEL;9192
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: TOLUENE (SARA III)
Ingredient Sequence Number: 03
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: B
NIOSH (RTECS) Number: XS5250000
CAS Number: 108-88-3
OSHA PEL: 50 PPM; 9293
ACGIH TLV: 100 PPM/150 STEL
Other Recommended Limit: N/K
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Physical/Chemical Characteristics
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Appearance And Odor: CLEAR,BRIGHT LIQUID,CHARACTERISTIC ODOR
Boiling Point: 80F TO 430F
Melting Point: N/K
Vapor Pressure (MM Hg/70 F): 9-151BRVP
Vapor Density (Air=1): 3 TO 4
Specific Gravity: 0.75
Decomposition Temperature: N/K
Evaporation Rate And Ref:
Solubility In Water: NEGLIGIBLE
Percent Volatiles By Volume: N/K
Viscosity:
pH: N/K
Radioactivity:
Form (Radioactive Matl):
Magnetism (Milligauss):
Corrosion Rate (IPY): N/K

Autoignition Temperature:

Fire and Explosion Hazard Data

Flash Point: -45 DEG F
Flash Point Method: N/K
Lower Explosive Limit: 1.3
Upper Explosive Limit: 7.6
Extinguishing Media: DRY CHEMICAL (B-C),CARBON DIOXIDE,WATER FOG,FOAM (WATER MAY BE INEFFECTIVE)
Special Fire Fighting Proc: N/K
Unusual Fire And Expl Hazrds: N/K

Reactivity Data

Stability: NO
Cond To Avoid (Stability): BURNING CAN BE STARTED EASILY
Materials To Avoid: N/K
Hazardous Decomp Products: N/K
Hazardous Poly Occur: N/K
Conditions To Avoid (Poly): N/K

Health Hazard Data

LD50-LC50 Mixture: N/K
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: EYE:NO SIGNIFICANT IRRITATION EXPECTED.SKIN: PROLONGED OR REPEATED CONTACT CAN DEFAT THE SKIN AND LEAD TO IRRITATION AND/OR DERMATITIS.INHALATION:VAPOR HARMFUL.WILL PRODUCE SYMPTOMS OF INTOXICATION,HEADACHE,DIZZINESS AND NAUSEA.INGESTION:LOW VISCOSITY PRODUCT. HARMFUL IF SWALLOWED OR ASPIRATED INTO LUNGS.
Carcinogenicity - NTP: N/K
Carcinogenicity - IARC: N/K
Carcinogenicity - OSHA: N/K
Explanation Carcinogenicity: BENZENE HAS BEEN SHOWN TO CAUSE CANCER (LUEKEMIA) AND OTHER ADVERSE BLOOD EFFECTS (ANEMIA).
Signs/Symptoms Of Overexp: SAME AS ACUTE AND CHRONIC SYMPTOMS
Med Cond Aggravated By Exp: N/K
Emergency/First Aid Proc: EYES:FLUSH EYES WITH PLENTY OF WATER.SKIN: WASH EXPOSED SKIN WITH SOAP AND WATER.REMOVE CONTAMINATED CLOTHING, INCLUDING SHOES AND CLEAN AND DRY THOROUGHLY.INHALATION:IF ADVERSE EFFECTS OCCUR,REMOVE TO UNCONTAMINATED AREA.GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING.GET MEDICAL ATTENTION.INGESTION:IF SWALLOWED DO NOT INDUCE VOMITING.GET IMMEDIATE MEDICAL ATTENTION.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: REMOVE OR SHUT OFF ALL SOURCES OF IGNITION. USE WATER SPRAY TO DISPERSE VAPORS.INCREASE VENTILATION IF POSSIBLE.
Neutralizing Agent: N/K
Waste Disposal Method: ENCLOSED-CONTROLLED INCINERATION IS RECOMMENDED UNLESS DIRECTED OTHERWISE BY APPLICABLE ORDINANCES.
Precautions-Handling/Storing: STORE AWAY FROM HEAT,IGNITION SOURCES, AND OPEN FLAME IN ACCORDANCE WITH APPLICABLE FEDERAL,STATE OR LOCAL REGULATIONS.

Other Precautions: AVOID STRONG OXIDIZIERS.USE AS MOTOR FUEL.

Control Measures

Respiratory Protection: AVOID BREATHING VAPOR AND/OR MIST.USE WITH ADEQUATE VENTILATION.
Ventilation: KEEP AREA WELL VENTILATED.
Protective Gloves: WEAR PROTECTIVE GLOVES,IF REPEATED USE.
Eye Protection: SAFETY GLASSES ARE GOOD PRACTICE.
Other Protective Equipment: N/K
Work Hygienic Practices: N/K
Suppl. Safety & Health Data: ASPIRATION OF THIS PRODUCT INTO THE LUNGS CAN CAUSE CHEMICAL PNEUMONIA AND CAN BE FATAL.ASPIRATION INTO THE LUNGS CAN OCCUR WHILE VOMITING AFTER INGESTION OF THIS PRODUCT.

DOD Hazardous Materials Information System
DoD 6050.5-L
AS OF May 1993

FSC: 6810
NIIN: 00K000829
Manufacturer's CAGE: 19139
Part No. Indicator: A
Part Number/Trade Name: 719,ETHYLBENZENE

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General Information

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Item Name:
Manufacturer's Name: EASTMAN KODAK COMPANY
Manufacturer's Street: 343 STATE STREET
Manufacturer's P. O. Box:
Manufacturer's City: ROCHESTER
Manufacturer's State: NY
Manufacturer's Country: US
Manufacturer's Zip Code: 14650
Manufacturer's Emerg Ph #: 716-722-5151
Manufacturer's Info Ph #: 716-722-5151
Distributor/Vendor # 1:
Distributor/Vendor # 1 Cage:
Distributor/Vendor # 2:
Distributor/Vendor # 2 Cage:
Distributor/Vendor # 3:
Distributor/Vendor # 3 Cage:
Distributor/Vendor # 4:
Distributor/Vendor # 4 Cage:
Safety Data Action Code:
Safety Focal Point: K
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status:
Date MSDS Prepared: PRE-HCS
Safety Data Review Date: 18FEB83
Supply Item Manager:
MSDS Preparer's Name:
Preparer's Company:
Preparer's St Or P. O. Box:
Preparer's City:
Preparer's State:
Preparer's Zip Code:
Other MSDS Number:
MSDS Serial Number: BCBNK
Specification Number:
Spec Type, Grade, Class:
Hazard Characteristic Code: F3
Unit Of Issue: CO
Unit Of Issue Container Qty: 3 KG
Type Of Container:
Net Unit Weight:
NRC/State License Number:
Net Explosive Weight:
Net Propellant Weight-Ammo:
Coast Guard Ammunition Code:

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Ingredients/Identity Information
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Proprietary: NO
Ingredient: ETHYL BENZENE (SARA III)
Ingredient Sequence Number: 01
Percent: 100
Ingredient Action Code:
Ingredient Focal Point: K
NIOSH (RTECS) Number: DA0700000
CAS Number: 100-41-4
OSHA PEL: 100 PPM/125 STEL
ACGIH TLV: 100 PPM/125STEL 9192
Other Recommended Limit:
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Physical/Chemical Characteristics
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Appearance And Odor: COLORLESS LIQUID,AROMATIC ODOR.
Boiling Point: 277F/136C
Melting Point:
Vapor Pressure (MM Hg/70 F): 10
Vapor Density (Air=1): 3.66
Specific Gravity: 0.866
Decomposition Temperature:
Evaporation Rate And Ref: UNKNOWN
Solubility In Water: NEGLIGIBLE
Percent Volatiles By Volume: 100
Viscosity:
pH:
Radioactivity:
Form (Radioactive Matl):
Magnetism (Milligauss):
Corrosion Rate (IPY):
Autoignition Temperature:
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Fire and Explosion Hazard Data
==========
Flash Point: 59F/15C
Flash Point Method:
Lower Explosive Limit: 1.0
Upper Explosive Limit: UNK
Extinguishing Media: CO*2,DRY CHEMICAL
Special Fire Fighting Proc: SELF-CNTND BRTHG APP,H*2O SPRAY COOL CONT,
KNOCK DOWN VAPOR.
Unusual Fire And Expl Hazrds: CONT MAY EXPLODE IN HEAT OF FIRE.SPILL/
RUNOFF MAY POLLUTE,CAUSE FIRE OR EXPLOSION
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Reactivity Data
==========
Stability: YES
Cond To Avoid (Stability): NONE
Materials To Avoid: NONE
Hazardous Decomp Products: CO*2,CO
Hazardous Poly Occur: NO
Conditions To Avoid (Poly):

Health Hazard Data

LD50-LC50 Mixture:
Route Of Entry - Inhalation:
Route Of Entry - Skin:
Route Of Entry - Ingestion:
Health Haz Acute And Chronic:
Carcinogenicity - NTP:
Carcinogenicity - IARC:
Carcinogenicity - OSHA:
Explanation Carcinogenicity:
Signs/Symptoms Of Overexp: VAPORS IRRITAT EYES,RESPIR TRACT AND SKIN.
Med Cond Aggravated By Exp:
Emergency/First Aid Proc: INHALE:REMOVE TO FRESH AIR,GIVE CPR/O*2 IF NEED.EYES/SKIN:FLUSH WITH LG AMTS H*2O FOR 15 MIN.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: ELIMINATE IGNITION SOURCES.ABSORB SPILLED MATERIAL W.VERMICULITE.PLACE IN FIBER CARTON.WASH SPILL AREA WELL WITH SOAP & WATER.
Neutralizing Agent:
Waste Disposal Method: MIX WITH FLAMMABLE SOLVENT,SPRAY INTO INCINERATOR EQUIPPED WITH AFTERBURNER AND SCRUBBER.STATE AND LOCAL LAWS TAKE PRECEDENCE.
Precautions-Handling/Storing: STORE IN COOL DRY,WELL VENTILATED,LOW FIRE RISK AREA.PROTECT FROM PHYSICAL DAMAGE.KEEP CONTAINERS CLOSED.
Other Precautions: AVOID PROLONGED OR REPEATED CONTACT.REMOVE AND WASH CONTAMINATED CLOTHING.

Control Measures

Respiratory Protection: CONTROL VAPOR CONC BY LOCAL EXHAUST.
Ventilation: MECHANICAL/LOCAL FOR CONTROLLING VAPOR TO TLV(100 PPM)
Protective Gloves: IMPERVIOUS
Eye Protection: SAFETY/CHEM GOGGLES.
Other Protective Equipment: NORMAL FULL CLOTHING COVERING ARMS AND LEGS.
Work Hygienic Practices:
Suppl. Safety & Health Data:

DOD Hazardous Materials Information System
DoD 6050.5-L
AS OF May 1993

FSC: 6850
NIIN: 00N008593
Manufacturer's CAGE: 58326
Part No. Indicator: A
Part Number/Trade Name: ICE KING ANTIFREEZE/COOLANT (2060)

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General Information

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Item Name:
Manufacturer's Name: CONOCO INC.
Manufacturer's Street:
Manufacturer's P. O. Box: 1267
Manufacturer's City: PONCA CITY
Manufacturer's State: OK
Manufacturer's Country:
Manufacturer's Zip Code: 74603
Manufacturer's Emerg Ph #: 800-424-9300(CHEMTREC)TRANS EMERG.
Manufacturer's Info Ph #: 405-767-6000
Distributor/Vendor # 1:
Distributor/Vendor # 1 Cage:
Distributor/Vendor # 2:
Distributor/Vendor # 2 Cage:
Distributor/Vendor # 3:
Distributor/Vendor # 3 Cage:
Distributor/Vendor # 4:
Distributor/Vendor # 4 Cage:
Safety Data Action Code:
Safety Focal Point: N
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status:
Date MSDS Prepared: 04NOV85
Safety Data Review Date: 30AUG88
Supply Item Manager:
MSDS Preparer's Name:
Preparer's Company:
Preparer's St Or P. O. Box:
Preparer's City:
Preparer's State:
Preparer's Zip Code:
Other MSDS Number:
MSDS Serial Number: BCQQR
Specification Number: N/A
Spec Type, Grade, Class:
Hazard Characteristic Code:
Unit Of Issue: NK
Unit Of Issue Container Qty: N/K
Type Of Container: N/K
Net Unit Weight:
NRC/State License Number:
Net Explosive Weight:
Net Propellant Weight-Ammo:
Coast Guard Ammunition Code:

Ingredients/Identity Information

Proprietary: NO
Ingredient: ETHYLENE GLYCOL (SARA III)
Ingredient Sequence Number: 01
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: KW2975000
CAS Number: 107-21-1
OSHA PEL: C 50 PPM
ACGIH TLV: C 50 PPM,VAPOR; 9192
Other Recommended Limit: N/K (FP N/ORNL)

Physical/Chemical Characteristics

Appearance And Odor: FLUOROSCENT GREEN LIQUID;MILD GLYCOL ODOR.
Boiling Point: 320F,160C
Melting Point: N/K (FP N)
Vapor Pressure (MM Hg/70 F): 0.05 MMHG
Vapor Density (Air=1): 2.14
Specific Gravity: 1.125 (WATER=1)
Decomposition Temperature: N/K (FP N)
Evaporation Rate And Ref: N/A
Solubility In Water: COMPLETELY
Percent Volatiles By Volume: N/A
Viscosity:
pH: N/K
Radioactivity:
Form (Radioactive Matl):
Magnetism (Milligauss):
Corrosion Rate (IPY): N/K
Autoignition Temperature:

Fire and Explosion Hazard Data

Flash Point: 230F,110C
Flash Point Method: PMCC
Lower Explosive Limit: 3.2
Upper Explosive Limit: 15.3
Extinguishing Media: WATER SPRAY,DRY CHEMICAL,ALCOHOL RESISTANT FOAM,OR CARBON DIOXIDE.
Special Fire Fighting Proc: USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT (FP N).KEEP FIRE-EXPOS CNTNRS COOL W/ WATER.USE WATER SPRAY TO FLUSH SPILL FROM FIRE EXPOS (SEE SUP DAT
Unusual Fire And Expl Hazrds: COMBUST PRODS INCLUDE OXIDES & OTHER TOXIC MTLS,AS WELL A N OXIDES.IF WATER EVAPORATES OFF,RESIDUAL MATERIALS COULD BURN.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): N/K (FP N/ORNL)
Materials To Avoid: STRONG OXIDIZING AGENTS.
Hazardous Decomp Products: C DIOXIDE,C MONOXIDE,VAPORS OF ETHYLENEGLYCOL. SMALL AMTS OF NITROGEN OXIDES CAN BE PRODUCED.

Hazardous Poly Occur: NO
Conditions To Avoid (Poly): N/K (FP N/ORNL)

Health Hazard Data

LD50-LC50 Mixture: N/K (FP N/ORNL)
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: INHAL,SKIN ABSORPTION:MAY CAUSE CNS DEPRESSION AND LIVER OR KIDNEY TOXICITY.REPRODUCTION STUDIES IN RODENTS HAVE SHOWN THAT EXTREME HIGH DOSES,TOXIC TO PREGNANT FEMALE,WERE TOXIC TO NEWBORN & CAUSED BIRTH DEFECTS.IN THIS REGARD,VOLATILITY OF ETHYLENE GLYCOL LOW & EXPOSURE SHOULD BE EASY TO CONTROL.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NONE
Signs/Symptoms Of Overexp: INHAL:IRRITATING TO LUNGS.SKIN & EYES: IRRITATION.INGEST:N/K (FP N/ORNL).
Med Cond Aggravated By Exp: N/K (FP N/ORNL)
Emergency/First Aid Proc: INHAL:REMOVE TO FRESH AIR.IF BREATHING STOPS,PERFORM ARTF RESP.GET MD ATTN.SKIN:IMMED REMOVE CONTAM CLOTHING.WASH EXPOSED SKIN THOROUGHLY W/ SOAP & WATER.IF IRRIT PERSISTS,GET MD ATTN.EYES: IMMED FLUSH W/FRESH H*2O AT LEAST 15 MINUTES.GET MD ATTN.INGEST:INDUCE VOMITING,LOWERING VICTIM'S HEAD TO PREVENT ASPIRATION.GET MED ATTN.DO NOT ATTEMPT TO GIVE LIQUID TO AN UNCONSCIOUS PERSON.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: CONTAIN IMMED IN SMALLEST AREA POSS. RECOVER AS MUCH AS POSS BY SUCH METHOD AS VACUUMING FOLLOWED BY ABSORPTION ON ABSORBANT MATL.REMOVE CONTAM ITEMS INCLUDING SOILS & PUT IN CNTNR FOR DISPOSAL.AVOID WASHING/DIRECTING MTL TO STORM OF SANITARY SEWERS.
Neutralizing Agent: N/K (FP N/ORNL)
Waste Disposal Method: DISPOSAL MUST BE IN ACCORDANCE WITH FEDERAL,STATE AND LOCAL REGULATIONS (FP N).RECYCLE AS MUCH OF RECOVERABLE PRODUCT AS POSSIBLE.
Precautions-Handling/Storing: STORE AND HANDLE AS COMBUSTIBLE LIQUID.DO NOT STORE IN OPEN OR UNLABELED CNTNRS.KEEP OUT OF REACH OF CHILDREN & ANIMALS.DO NOT REUSE CNTNR.
Other Precautions: N/K (FP N/ORNL)

Control Measures

Respiratory Protection: NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN (FP N).
Ventilation: LOCAL AND GENERAL VENTILATION NECESSARY TO KEEP AIR CONCENTRATION BELOW TLV (FP N/ORNL).NORMAL SHOP VENTILATION (MFR).
Protective Gloves: PROTECTIVE GLOVES.
Eye Protection: CHEMICAL WORKERS GOGGLES (FP N).
Other Protective Equipment: NOT NORMALLY REQUIRED.
Work Hygienic Practices: LAUNDER CONTAMINATED CLOTHING BEFORE REUSE. EXTREMELY CONTAMINATED LEATHER SHOES SHOULD BE DISCARDED.
Suppl. Safety & Health Data: SPEC FIRE FIGHTING PROC:OR,IF SPILL HAS NOT IGNITED,TO DISPERSE THE VAPORS & PROVIDE PROTECTION FOR MEN ATTEMPTING TO STOP A LEAK.

DOD Hazardous Materials Information System
DoD 6050.5-L
AS OF May 1993

FSC: 9140
NIIN: 00B030040
Manufacturer's CAGE: 58326
Part No. Indicator: A
Part Number/Trade Name: DIESEL FUEL

General Information

Item Name: N/K
Manufacturer's Name: CONOCO INC.
Manufacturer's Street: N/K
Manufacturer's P. O. Box: 1267
Manufacturer's City: PONCA CITY
Manufacturer's State: OK
Manufacturer's Country: US
Manufacturer's Zip Code: 74603
Manufacturer's Emerg Ph #: 800424-9300
Manufacturer's Info Ph #: 405767-6000
Distributor/Vendor # 1: N/K
Distributor/Vendor # 1 Cage:
Distributor/Vendor # 2:
Distributor/Vendor # 2 Cage:
Distributor/Vendor # 3:
Distributor/Vendor # 3 Cage:
Distributor/Vendor # 4:
Distributor/Vendor # 4 Cage:
Safety Data Action Code:
Safety Focal Point: B
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status:
Date MSDS Prepared: 28AUG87
Safety Data Review Date: 29AUG88
Supply Item Manager:
MSDS Preparer's Name: N/K
Preparer's Company: N/K
Preparer's St Or P. O. Box: N/K
Preparer's City: N/K
Preparer's State:
Preparer's Zip Code: N/K
Other MSDS Number:
MSDS Serial Number: BBBJX
Specification Number:
Spec Type, Grade, Class:
Hazard Characteristic Code:
Unit Of Issue:
Unit Of Issue Container Qty:
Type Of Container:
Net Unit Weight:
NRC/State License Number:
Net Explosive Weight:
Net Propellant Weight-Ammo:
Coast Guard Ammunition Code:

Ingredients/Identity Information

Proprietary: NO
Ingredient: HYDROCARBONS (AROMATIC AND PARAFFINIC HYDROCARBONS)
Ingredient Sequence Number: 01
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: B
NIOSH (RTECS) Number: 1004040AH
CAS Number: N/R
OSHA PEL: N/K
ACGIH TLV: N/K
Other Recommended Limit: N/K

Physical/Chemical Characteristics

Appearance And Odor: CLEAR OR LIGHT YELLOW LIQUID;AROMATIC ODOR
Boiling Point: 350-680F
Melting Point: N/K
Vapor Pressure (MM Hg/70 F): 1
Vapor Density (Air=1): N/K
Specific Gravity: 0.85-0.93
Decomposition Temperature: N/K
Evaporation Rate And Ref: N/K
Solubility In Water: INSOLUBLE
Percent Volatiles By Volume: NIL
Viscosity:
pH: N/K
Radioactivity:
Form (Radioactive Matl):
Magnetism (Milligauss):
Corrosion Rate (IPY): N/K
Autoignition Temperature:

Fire and Explosion Hazard Data

Flash Point: 130F MIN.
Flash Point Method: TCC
Lower Explosive Limit: 0.4
Upper Explosive Limit: 6
Extinguishing Media: USE WATER SPRAY,DRY CHEMICAL,FOAM,OR CARBON DIOXIDE
Special Fire Fighting Proc: USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.IF LEAK OR SPILL HAS NOT IGNITED USE WATER SPRAY TO DISPERSE THE VAPORS AND TO FLUSH SPILLS AWAY FROM EXPOSURE.
Unusual Fire And Expl Hazrds: PRODUCTS OF COMBUSTION MAY CONTAIN CARBON MONOXIDE,CARBON DIOXIDE,AND OTHER TOXIC MATERIALS.DO NOT ENTER ENCLOSED OR CONFINED SPACE WITHOUT PROTECTIVE EQUIP.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): OXIDIZING MATERIALS,HEAT,FLAME
Materials To Avoid: N/K
Hazardous Decomp Products: INCOMPLETE COMBUSTION MAY PRODUCE CARBON MONOXIDE.
Hazardous Poly Occur: NO

Conditions To Avoid (Poly): N/R

Health Hazard Data

LD50-LC50 Mixture: N/K
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: THE PRODUCT MAY CAUSE IRRITATION TO EYES, SKIN,OR LUNGS AFTER PROLONGED OR REPEATED EXPOSURE.EXTREME EXPOSURE OR ASPIRATION INTO LUNGS MAY CAUSE PNEUMONIA.OVEREXPOSURE MAY CAUSE WEAKNESS, HEADACHE,NAUSEA,CONFUSION,BLURRED VISION,DROWSINESS,AND OTHER NERVOUS SYSTEM EFFECTS.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: N/K
Signs/Symptoms Of Overexp: SEVERE OVEREXPOSURE MAY CAUSE DIZZINESS, SLURRED SPEECH,FLUSHED FACE,UNCONSCIOUSNESS,OR CONVULSIONS.
Med Cond Aggravated By Exp: N/K
Emergency/First Aid Proc: EYES:IMMEDIATELY FLUSH EYES W/PLENTY OF WATER FOR 15 MIN.SKIN:WASH EXPOSED SKIN THOROUGHLY W/SOAP AND WATER.CONTACT PHYSICIAN IF IRRITATION DEVELOPS.INHALATION:REMOVE VICTIM TO FRESH AIR.IF BREATHING STOPS,ADMINISTER ARTIFICIAL RESUSCITATION.INGESTION:DO NOT INDUCE VOMITING.IF VOMITING BEGINS LOWER VICTIMS HEAD IN AN EFFORT TO PREVENT VOMITUS FROM ENTERING LUNGS.SEEK MEDICAL ATTENTION.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: THIS MATERIAL IS COMBUSTIBLE.APPROPRIATE PRECAUTIONS SHOULD BE TAKE CONTAN SPILL IMMEDIATELY IN SMALLEST AREA POSSIBLE.RECOVER AS MUCH OF THE PRODUCT ITSELF AS POSSIBLE BY SUCH METHODS AS VACUUMING,FOLLOWED BY SOAKING UP RESIDUAL FLUIDS W/ABSORBENT.
Neutralizing Agent: N/K
Waste Disposal Method: RECYCLE AS MUCH OF THE RECOVERABLE PRODUCT AS POSSIBLE.DISPOSE OF NONRECYCLABLE MATERIAL AS A RCRA HAZARDOUS WASTE BY SUCH METHODS AS INCINERATION,COMPLYING WITH FEDERAL,STATE AND LOCAL REGULATIONS.
Precautions-Handling/Storing: N/K
Other Precautions: N/K

Control Measures

Respiratory Protection: USE AIR MASK OR HYDROCARBON ABSORBING RESPIRATOR WHEN EXPOSED TO OIL SPRAY OR MISTS.
Ventilation: GENERAL MECHANICAL VENTILATION IS NORMALLY ADEQUATE.
Protective Gloves: CHEMICAL RESISTANT/VINYL,NEOPRENE,NBR
Eye Protection: FACE SHIELD WHEN SPLASHING IS PROBABLE
Other Protective Equipment: COVERALLS OR OTHER PROTECTIVE APPAREL NEEDED IF SPLASHING IS PROBABLE.
Work Hygienic Practices: N/K
Suppl. Safety & Health Data: AVOID ALL IGNITION SOURCES UNTIL THE CONTAMINATED STORAGE CONTAINER IS ISOLATED AND CLEAR OF ALL FLAMMABLE AND TOXIC VAPOR CONCENTRATIONS.

DOD Hazardous Materials Information System
DoD 6050.5-L
AS OF May 1993

FSC: 8030
NIIN: 002758121
Manufacturer's CAGE: 00297
Part No. Indicator: A
Part Number/Trade Name: BITUMASTIC 50

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General Information

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Item Name: COAL-TAR BASE COATING, COLD APPLICATION, STEEL SURFACE
Manufacturer's Name: KOPPERS COMPANY, INC.
Manufacturer's Street: 436 SEVENTH AVENUE
Manufacturer's P. O. Box:
Manufacturer's City: PITTSBURGH
Manufacturer's State: PA
Manufacturer's Country: US
Manufacturer's Zip Code: 15219
Manufacturer's Emerg Ph #: 1-800-553-5631
Manufacturer's Info Ph #: 1-800-556-7737
Distributor/Vendor # 1:
Distributor/Vendor # 1 Cage:
Distributor/Vendor # 2:
Distributor/Vendor # 2 Cage:
Distributor/Vendor # 3:
Distributor/Vendor # 3 Cage:
Distributor/Vendor # 4:
Distributor/Vendor # 4 Cage:
Safety Data Action Code:
Safety Focal Point: G
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 004
Status:
Date MSDS Prepared: DEC87
Safety Data Review Date: 21JUN88
Supply Item Manager: GSA
MSDS Preparer's Name: N/K
Preparer's Company:
Preparer's St Or P. O. Box:
Preparer's City:
Preparer's State:
Preparer's Zip Code:
Other MSDS Number:
MSDS Serial Number: BDSHQ
Specification Number: MIL-C-18480
Spec Type, Grade, Class: N/K
Hazard Characteristic Code:
Unit Of Issue: CN
Unit Of Issue Container Qty: 5 GL
Type Of Container: METAL
Net Unit Weight: N/K
NRC/State License Number: N/K
Net Explosive Weight: N/K
Net Propellant Weight-Ammo: N/K
Coast Guard Ammunition Code: N/K

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Ingredients/Identity Information
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Proprietary: NO
Ingredient: COAL TAR PITCH
Ingredient Sequence Number: 01
Percent: 20
Ingredient Action Code:
Ingredient Focal Point: G
NIOSH (RTECS) Number: GF8600000
CAS Number: 8007-45-2
OSHA PEL: 0.2 MG/M3
ACGIH TLV: 0.2 MG/M3
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: CREOSOTE (SARA III)
Ingredient Sequence Number: 02
Percent: 25
Ingredient Action Code:
Ingredient Focal Point: G
NIOSH (RTECS) Number: GF8615000
CAS Number: 8001-58-9
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: NAPHTHALENE (SARA III)
Ingredient Sequence Number: 03
Percent: 2
Ingredient Action Code:
Ingredient Focal Point: G
NIOSH (RTECS) Number: QJ0525000
CAS Number: 91-20-3
OSHA PEL: 10 PPM/15 STEL
ACGIH TLV: 10 PPM/15 STEL; 9192
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: INDENE
Ingredient Sequence Number: 04
Percent: 15
Ingredient Action Code:
Ingredient Focal Point: G
NIOSH (RTECS) Number: NK8225000
CAS Number: 95-13-6
OSHA PEL: 10 PPM
ACGIH TLV: 10 PPM; 9192
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: BENZENE (SARA III)
Ingredient Sequence Number: 05
Percent: 0.5
Ingredient Action Code:
Ingredient Focal Point: G

NIOSH (RTECS) Number: CY1400000
CAS Number: 71-43-2
OSHA PEL: 1PPM/5STEL;1910.1028
ACGIH TLV: 10 PPM; A2; 9192
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: XYLENES (O-,M-,P- ISOMERS) (SARA III)
Ingredient Sequence Number: 06
Percent: 2
Ingredient Action Code:
Ingredient Focal Point: G
NIOSH (RTECS) Number: ZE2100000
CAS Number: 1330-20-7
OSHA PEL: 100 PPM/150 STEL
ACGIH TLV: 100 PPM/150STEL;9192
Other Recommended Limit: N/K

Physical/Chemical Characteristics

Appearance And Odor: BLACK LIQUID WITH COAL TAR ODOR
Boiling Point: N/R
Melting Point: N/K
Vapor Pressure (MM Hg/70 F): N/K
Vapor Density (Air=1): N/R
Specific Gravity: 10.7 LBS/GL
Decomposition Temperature: N/K
Evaporation Rate And Ref: VERY SLOW
Solubility In Water: NIL
Percent Volatiles By Volume: 32
Viscosity: N/K
pH: N/K
Radioactivity: N/K
Form (Radioactive Matl): N/K
Magnetism (Milligauss): N/K
Corrosion Rate (IPY): N/K
Autoignition Temperature: N/K

Fire and Explosion Hazard Data

Flash Point: 100F-38C
Flash Point Method: PM
Lower Explosive Limit: N/K
Upper Explosive Limit: N/K
Extinguishing Media: DRY CHEMICAL, CARBON DIOXIDE, FOAM OR WATER SPRAY. WATER OR FOAM MAY CAUSE FROTHING, IF MOLTEN.
Special Fire Fighting Proc: WEAR COMPLETE FIRE SERVICE PROTECTIVE EQUIPMENT, INCLUDING FULL-FACE MSHA/NIOSH APPROVED SELF-CONTAIN BREATHING APPARATUS.TOXIC VAPORS MAY BE GIVEN OFF IN FIRE.
Unusual Fire And Expl Hazrds: DURING FIRES, VAPORS/DECOMPOSITION PRODUCTS MAY BE RELEASED FORMING FLAMMABLE/EXPLOSIVE MIX IN AIR.CLOSED CONTAINERS MAY EXPLODE WHEN EXPOSED TO EXTREME HEAT.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): NONE

Materials To Avoid: OXIDIZING MATERIALS. CONTACT WITH PVC PIPE.
Hazardous Decomp Products: TOXIC FUMES.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NONE

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Health Hazard Data

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LD50-LC50 Mixture: N/K
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: MATERIAL CAN BE ABSORBED THROUGH THE SKIN PRODUCING INTERNAL ORGAN DAMAGE & POSSIBLE DEATH. REPEATED AND/OR PROLONGED CONTACT MAY CAUSE SERIOUS SKIN DISOBY SUNLIGHT, PHOTOTOXIC SKIN RE PROLONGED SKIN DISORDERS,HB'ECA
HEATED THERMAL BURNS. ABSORBED INTERNALORGAN
Carcinogenicity - NTP:
Carcinogenicity - IARC:
Carcinogenicity - OSHA:
Explanation Carcinogenicity:
Signs/Symptoms Of Overexp:
Med Cond Aggravated By Exp:
Emergency/First Aid Proc:

LD50-LC50 Mixture: POSS DEATH.IB'FINHAL: REPIR TRA
Route Of Entry - Inhalation:
Route Of Entry - Skin:
Route Of Entry - Ingestion:
Health Haz Acute And Chronic:
Carcinogenicity - NTP:
Carcinogenicity - IARC:
Carcinogenicity - OSHA:
Explanation Carcinogenicity:
Signs/Symptoms Of Overexp:
Med Cond Aggravated By Exp:
Emergency/First Aid Proc:

DOD Hazardous Materials Information System
DoD 6050.5-L
AS OF May 1993

FSC: 6810
NIIN: 00N025040
Manufacturer's CAGE: 75675
Part No. Indicator: A
Part Number/Trade Name: LUPERCO PMA-25, 896

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General Information

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Item Name:
Manufacturer's Name: PENNWALT CORP
Manufacturer's Street: 1740 MILITARY RD
Manufacturer's P. O. Box: 1048
Manufacturer's City: BUFFALO
Manufacturer's State: NY
Manufacturer's Country: US
Manufacturer's Zip Code: 14240
Manufacturer's Emerg Ph #: 716-877-1740
Manufacturer's Info Ph #: 800-558-5575
Distributor/Vendor # 1:
Distributor/Vendor # 1 Cage:
Distributor/Vendor # 2:
Distributor/Vendor # 2 Cage:
Distributor/Vendor # 3:
Distributor/Vendor # 3 Cage:
Distributor/Vendor # 4:
Distributor/Vendor # 4 Cage:
Safety Data Action Code:
Safety Focal Point: N
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SMJ
Date MSDS Prepared: 26JAN90
Safety Data Review Date: 16JAN92
Supply Item Manager:
MSDS Preparer's Name: MARKETING SERVICES DEPT
Preparer's Company: SAME
Preparer's St Or P. O. Box:
Preparer's City:
Preparer's State:
Preparer's Zip Code:
Other MSDS Number:
MSDS Serial Number: BMGLL
Specification Number:
Spec Type, Grade, Class:
Hazard Characteristic Code: N/
Unit Of Issue:
Unit Of Issue Container Qty:
Type Of Container:
Net Unit Weight:
NRC/State License Number:
Net Explosive Weight:
Net Propellant Weight-Ammo:
Coast Guard Ammunition Code:

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Ingredients/Identity Information
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Proprietary: NO
Ingredient: MALEIC MONOPEROXY MALEIC ACID, 1-TERT-BUTYL ESTER; (TERT-BUTYL PEROXYMALEIC ACID)
Ingredient Sequence Number: 01
Percent: 25
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: ON4770000
CAS Number: 1931-62-0
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: PHTHALIC ACID, BIS(2-ETHYLHEXYL)ESTER; (BIS-2-ETHYLHEXYL-PHTHALATE)
Ingredient Sequence Number: 02
Percent: 54
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: TI0350000
CAS Number: 117-81-7
OSHA PEL: 5MG/M3;10MG/M3 STEL
ACGIH TLV: 5MG/M3;10MG/M3 STEL
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: PHTHALIC ACID, BENZYL BUTYL ESTER; (BUTYL BENZYL PHTHALATE)
Ingredient Sequence Number: 03
Percent: 3
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: TH9990000
CAS Number: 85-68-7
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE
Other Recommended Limit: N/K
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Physical/Chemical Characteristics
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Appearance And Odor: WHITE PASTE, GLUE-LIKE ODOR.
Boiling Point: N/K
Melting Point: N/A
Vapor Pressure (MM Hg/70 F): N/K
Vapor Density (Air=1): N/K
Specific Gravity: 1.0405
Decomposition Temperature: 140F,60C
Evaporation Rate And Ref: N/K
Solubility In Water: SLIGHT
Percent Volatiles By Volume: 0
Viscosity:
pH: N/K
Radioactivity:
Form (Radioactive Matl):

Magnetism (Milligauss):
Corrosion Rate (IPY): N/K
Autoignition Temperature:

Fire and Explosion Hazard Data

Flash Point: NOT APPLICABLE
Flash Point Method: N/K
Lower Explosive Limit: N/K
Upper Explosive Limit: N/K
Extinguishing Media: WATER SPRAY, WATER FOG, DRY CHEMICAL, FOAM.
Special Fire Fighting Proc: IF LARGE AMOUNT INVOLVED, EVACUATE AREA & FIGHT FIRE FROM SAFE DISTANCE. COOL SURROUNDING MATL W/WATER. WEAR NIOSH/MSHA APPROVED SCBA & FULL PROT EQUIP (FP N).
Unusual Fire And Expl Hazrds: CONTAMINATION, TEMPERATURE - CAN DECOMPOSE WITH FORCE IF CONFINED DURING EXPOSURE TO FIRE.

Reactivity Data

Stability: NO
Cond To Avoid (Stability): EXPOSURE TO HEAT, FLAMES, SPARKS, IGNITION SOURCES, CONTAMINATION.
Materials To Avoid: STRONG ACIDS, STRONG ALKALIS, STRONG OXIDIZERS AND REDUCING AGENTS.
Hazardous Decomp Products: DECOMPOSITION PRODUCTS ARE FLAMMABLE.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT

Health Hazard Data

LD50-LC50 Mixture: NOT ESTABLISHED
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: MODERATE SKIN AND EYE IRRITATION. SKIN SENSITIZER. THIS PRODUCT CONTAIN DI-OCTYL PHTHLATE, A POSSIBLE CANCER HAZARD BASED ON ANIMAL DATA. MAY CAUSE CANCER. RISK OF CANCER DEPENDS ON PERIOD AND LEVEL OF EXPOSURE.
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: BIS-2-ETHYLHEXYL PHTHALATE: GROUP 2B (IARC), GROUP 2 (NTP).
Signs/Symptoms Of Overexp: SEE HEALTH HAZARDS.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: INGEST: DO NOT INDUCE VOMITING. GET EMERGENCY MED ATTN. SKIN: FLUSH W/SOAP & WATER. GET MEDICAL ATTN. EYES: IMMED FLUSH W/PLENTY OF WATER FOR AT LEAST 15 MINUTE. GET MEDICAL ATTN. INHAL: REMOVE TO FRESH AIR. IF NOT BRTHG, GIVE ARTIFICIAL RESPIRATION. GET MED ATTN.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: ABSORB WITH VERMICULITE/PERLITE, SWEEP OR SCOOP UP USING NON-SPARKING TOOLS AND REMOVE.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: CONSULT W/LUCIDOL REPRESENTATIVE FOR THE TELEPHONE NBR OF YOUR STATE'S HAZARDOUS WASTE AGENCY. DISPOSAL MUST BE I/A/W FEDERAL,

STATE, AND LOCAL REGULATIONS (FP N).
Precautions-Handling/Storing: STORE BELOW 100F (38C) TO MAINTAIN ACTIVE O*2 CONTENT. DO NOT STORE NEAR COMBUSTIBLES. KEEP CONTAINER CLOSED. KEEP AWAY FROM HEAT, SPARKS, & FLAMES.
Other Precautions: WASH THORO AFTER HNDLG. DO NOT GET IN EYES/SKIN/CLTHG. EMPTY CONTR MAY CONTAIN HAZ RESIDUES. STORE IN TIGHTLY CLOSED CONTRS. DO NOT REUSE CONTR.

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Control Measures

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Respiratory Protection: USE NIOSH/MSHA APPROVED CAN OR CARTRIDGE, GAS OR VAPOR TYPE RESPIRATOR.
Ventilation: USE WITH ADEQUATE VENTILATION. LOCAL EXHAUST.
Protective Gloves: NEOPRENE GLOVES.
Eye Protection: CHEM WORK GOGG/FULL LENGTH FSHLD (FP N).
Other Protective Equipment: EYEWASH STATION.
Work Hygienic Practices: WASH THOROUGHLY AFTER HANDLING.
Suppl. Safety & Health Data: THIS PROD CONTAINS TOXIC CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF THE EMERGENCY PLANNING & COMMUNITY RIGHT-TO-KNOW ACT OF 1986 AND OF 40 CFR 372.

DOD Hazardous Materials Information System
DoD 6050.5-L
AS OF May 1993

FSC: 6810
NIIN: 002815267
Manufacturer's CAGE: 1B464
Part No. Indicator: A
Part Number/Trade Name: B-411, BENZENE

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General Information

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Item Name: BENZENE, ACS
Manufacturer's Name: FISHER SCIENTIFIC
Manufacturer's Street: 1 REAGENT LANE
Manufacturer's P. O. Box:
Manufacturer's City: FAIR LAWN
Manufacturer's State: NJ
Manufacturer's Country: US
Manufacturer's Zip Code: 07410
Manufacturer's Emerg Ph #: 201-796-7100
Manufacturer's Info Ph #: 201-796-7100
Distributor/Vendor # 1:
Distributor/Vendor # 1 Cage:
Distributor/Vendor # 2:
Distributor/Vendor # 2 Cage:
Distributor/Vendor # 3:
Distributor/Vendor # 3 Cage:
Distributor/Vendor # 4:
Distributor/Vendor # 4 Cage:
Safety Data Action Code:
Safety Focal Point: N
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 002
Status: SMJ
Date MSDS Prepared: 19MAR86
Safety Data Review Date: 23JUN92
Supply Item Manager:
MSDS Preparer's Name:
Preparer's Company:
Preparer's St Or P. O. Box:
Preparer's City:
Preparer's State:
Preparer's Zip Code:
Other MSDS Number:
MSDS Serial Number: BPQSQ
Specification Number:
Spec Type, Grade, Class:
Hazard Characteristic Code: NK
Unit Of Issue:
Unit Of Issue Container Qty:
Type Of Container:
Net Unit Weight:
NRC/State License Number:
Net Explosive Weight:
Net Propellant Weight-Ammo:
Coast Guard Ammunition Code:

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Ingredients/Identity Information
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Proprietary: NO
Ingredient: BENZENE (SARA III)
Ingredient Sequence Number: 01
Percent: 100
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: CY1400000
CAS Number: 71-43-2
OSHA PEL: 10 PPM
ACGIH TLV: 10 PPM
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: EFTS OF OVEREXP:DROPLETS CAUSED MODERATE BURNING, BUT ONLY SLIGHT TEMPORARY INJURY TO EPITHELIAL CELLS. INGEST: (ING 3)
Ingredient Sequence Number: 02
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: 9999999ZZ
CAS Number: N/K
OSHA PEL: N/K
ACGIH TLV: N/K
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: ING 2:MAY CAUSE NAUSEA, VOMITING, SORE THROAT, ABDOMINAL PAIN & DIARRHEA. THIS SUBSTANCE HAS PRODUCED REPRO EFTS (ING 4)
Ingredient Sequence Number: 03
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: 9999999ZZ
CAS Number: N/K
OSHA PEL: N/K
ACGIH TLV: N/K
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: ING 3:IN EXPERIMENTAL ANIMAL (RATS) FEEDING STUDIES. CHRONIC: INHAL: LONG-TERM EXPOSURES TO LOW CONCS HAVE BEEN (ING 5)
Ingredient Sequence Number: 04
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: 9999999ZZ
CAS Number: N/K
OSHA PEL: N/K
ACGIH TLV: N/K
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: ING 4:OBSERVED TO HAVE AN INITIAL STIMULANT EFT ON BONE MARROW, PRODUCING AN INCR OF ERYTHROCYTES, LEUKOCYTES OR (ING 6)

Ingredient Sequence Number: 05
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: 9999999ZZ
CAS Number: N/K
OSHA PEL: N/K
ACGIH TLV: N/K
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: ING 5:PLATELETS, FOLLOWED BY DEPRESSANT EFFECT PROGRESSING TO APLASTIC ANEMIA, LEUKOPENIA, PANCYTOPENIA & (ING 7)
Ingredient Sequence Number: 06
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: 9999999ZZ
CAS Number: N/K
OSHA PEL: N/K
ACGIH TLV: N/K
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: ING 6:THROMBOCYTOPENIA. SKIN:RPTD/PRLNGD CNTCT MAY RESULT IN DRY, SCALY DERM, PURPURA, POSS SECONDARY INFECTIONS (ING 8)
Ingredient Sequence Number: 07
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: 9999999ZZ
CAS Number: N/K
OSHA PEL: N/K
ACGIH TLV: N/K
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: ING 7:& LESIONS RESEMBLING 1ST/2ND DEGREE BURNS. POSS IT IS A SKIN SENSITIZER. PRLNGD ABSORP MAY CAUSE ANEMIA OR (ING 9)
Ingredient Sequence Number: 08
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: 9999999ZZ
CAS Number: N/K
OSHA PEL: N/K
ACGIH TLV: N/K
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: ING 8:POSS LEUKEMIA. EYE:CASE REPORTS SUGGEST BENZENE EXPOSURE MAY BE ASSOC W/RETROBULBAR NEURITIS OR OPTIC (ING 10)
Ingredient Sequence Number: 09
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: 9999999ZZ

CAS Number: N/K
OSHA PEL: N/K
ACGIH TLV: N/K
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: ING 9:NEURITIS. 50% OF RATS EXPOSED TO 50PPM FOR >600 HOURS DEVELOPED CATARACTS. FOR MORE EXACTING INFORMATION (ING 11)
Ingredient Sequence Number: 10
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: 9999999ZZ
CAS Number: N/K
OSHA PEL: N/K
ACGIH TLV: N/K
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: ING 10:CONCERNING HEALTH HAZARDS, CONTACT NEHC (FP N).
Ingredient Sequence Number: 11
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: 9999999ZZ
CAS Number: N/K
OSHA PEL: N/K
ACGIH TLV: N/K
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: FIRST AID PROC:REMAINS (APPROX 15-20 MIN). GET MD IMMED. INGEST:IF CONSCIOUS & NOT CONVULSIVE, GIVE LG QTYS OF (ING 13)
Ingredient Sequence Number: 12
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: 9999999ZZ
CAS Number: N/K
OSHA PEL: N/K
ACGIH TLV: N/K
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: ING 12:WATER TO DILUTE. DO NOT INDUCE VOMIT. GET MD IMMEDIATELY.
Ingredient Sequence Number: 13
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: 9999999ZZ
CAS Number: N/K
OSHA PEL: N/K
ACGIH TLV: N/K
Other Recommended Limit: N/K

Proprietary: NO

Ingredient: SPILL PROC:EFFECTIVE, IN ORDER TO REDUCE VOLUME OF MATL FOR LATER DISPOSAL. NO SMOKING, FLAMES OR FLARES IN (ING 15)
Ingredient Sequence Number: 14
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: 9999999ZZ
CAS Number: N/K
OSHA PEL: N/K
ACGIH TLV: N/K
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: ING 14:HAZARD AREA. KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARD AREA AND DENY ENTRY.
Ingredient Sequence Number: 15
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: 9999999ZZ
CAS Number: N/K
OSHA PEL: N/K
ACGIH TLV: N/K
Other Recommended Limit: N/K
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Physical/Chemical Characteristics
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Appearance And Odor: COLORLESS TO LIGHT-YELLOW LIQUID W/AROMATIC ODOR.
Boiling Point: 176F,80C
Melting Point: 42F,5.6C
Vapor Pressure (MM Hg/70 F): 74.6 @ 20C
Vapor Density (Air=1): 2.8
Specific Gravity: 0.9
Decomposition Temperature: N/K
Evaporation Rate And Ref: 1 (CCL4 = 1)
Solubility In Water: 0.1%
Percent Volatiles By Volume: N/K
Viscosity:
pH: N/K
Radioactivity:
Form (Radioactive Matl):
Magnetism (Milligauss):
Corrosion Rate (IPY): N/K
Autoignition Temperature:
==========
Fire and Explosion Hazard Data
==========
Flash Point: 12F,-11C
Flash Point Method: N/K
Lower Explosive Limit: 1.5%
Upper Explosive Limit: 8%
Extinguishing Media: DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR FOAM. LARGER FIRES:WATER SPRAY, FOG OR ALCOHOL FOAM.
Special Fire Fighting Proc: WEAR NIOSH/MSHA APPRVD SCBA & FULL PROT EQUIP(FP N). MOVE CNTNR FROM FIRE AREA IF POSS.COOL FIRE-EXPSD CNTNRS W/ WATER FROM SIDE UNTIL WELL AFTER FIRE(SUPP DATA)
Unusual Fire And Expl Hazrds: DANGEROUS FIRE & MOD EXPLO HAZ WHEN EXPSD TO

HEAT/FLAME. VAPS HEAVIER THAN AIR & MAY TRAVEL CONSIDERABLE DISTANCE TO IGNIT SOURCE & FLASH BACK. VAP- (SUPP DATA)

Reactivity Data

Stability: YES
Cond To Avoid (Stability): ELEVATED TEMPERATURES AND PRESSURE.
Materials To Avoid: OXIDIZERS
Hazardous Decomp Products: COMBUSTION MAY RELEASE TOXIC CO*X.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT

Health Hazard Data

LD50-LC50 Mixture: LD50:(ORAL,RAT)4894 MG/KG.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: CASE REPORTS & EPIDEMIOLOGICAL STUDY HAVE ESTABLISHED A RELATIONSHIP BETWEEN BENZENE EXPOS & LEUKEMIA. BENZENE CAUSES SKIN IRRIT, CNS DEPRESS, BONE DEPRESS & LEUKEMIA. EXPOS TO COMMERCIAL BENZENE/BENZENE-CONTAINING MIXT MAY DMG HEMATOPOIETIC SYS. ACUTE:INHAL:200-500PPM HAS CAUSED CNS DEPRESS W/DIZZ, (EFTS OF OVEREXP)
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: YES
Explanation Carcinogenicity: BENZENE:GROUP 1 (NTP, IARC); OSHA REGULATED.
Signs/Symptoms Of Overexp: HLTH HAZ:WEAKNESS, HDCH, CONFUSION, NAUSEA & VOMIT. DELAYED PULM EDEMA, KIDNEY DMG & CEREBRAL EDEMA ARE POSS. SKIN:LIQ MAY DEFAT KERATIN LAYER & CAUSE ERYTHEMA, VESICULATION & DRY, SCALY DERM. DERM ABSORP MAY CAUSE NARCOTIC EFTS,USUALLY LESS SEVERE THAN INHAL. EYE: HIGH CONCS OF VAPS MAY CAUSE IRRIT & SMARTING. (ING 2)
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: INHAL:REMOVE TO FRESH AIR IMMED. IF BRTHG STOPPED, GIVE ARTF RESP. MAINTAIN AIRWAY & BLOOD PRESS & GIVE O*2 IF AVAIL. KEEP WARM/AT REST. GET MD IMMED. SKIN:REMOVE CONTAMD CLTHG & SHOES IMMED. WASH AFFECTED AREA W/SOAP/MILD DETERGENT & LG AMTS OF WATER UNTIL NO EVID OF CHEM REMAINS (APPROX 15-20 MIN). GET MD IMMED. EYE:WASH IMMED W/LG AMTS OF WATER, LIFTING LIDS, UNTIL NO EVID OF CHEM (ING 12)

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: PROVIDE VENT & RESP PROT. SHUT OFF IGNIT SOURCES. USE WATER SPRAY TO REDUCE VAPS. SML:TAKE UP W/SAND/OTHER INERT ABSORB & PLACE INTO CNTNRS FOR LATER DISP. CLOSE CNTNRS TIGHTLY & LABEL FLAMM. LG:DIKE AS CLOSE TO SOURCE OF SPILL AS PRACTICAL &(ING 14)
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: DISPOSE OF I/A/W FEDERAL, STATE AND LOCAL REGULATIONS (FP N).
Precautions-Handling/Storing: AVOID CONTACT WITH OR STORAGE W/STRONG OXIDIZERS.
Other Precautions: MAY BE IGNITED BY HEAT, SPARKS OR FLAMES. VAPORS MAY TRAVEL TO SOURCE OF IGNITION & FLASH BACK. CNTNR MAY EXPLODE IN HEAT OF FIRE. VAPOR EXPLOSION HAZARD INDOORS, OUTDOORS OR IN SEWERS. RUNOFF TO SEWER MAY CREATE FIRE OR EXPLOSION HAZARD.

Control Measures

Respiratory Protection: USE NIOSH/MSHA APPROVED RESPIRATOR. FOR SPECIFIC RESPIRATOR SELECTIONS, CONTACT NEHC (FP N).
Ventilation: PROVIDE LOCAL EXHAUST VENT/PROCESS ENCLOSURE TO MEET PERMISSIBLE EXPOSURE LIMIT. VENT EQUIP MUST BE EXPLOSION-PROOF.
Protective Gloves: IMPERVIOUS GLOVES (FP N).
Eye Protection: CHEMICAL WORKERS GOGGLES (FP N).
Other Protective Equipment: PROTECTIVE CLOTHING MUST COMPLY W/OSHA REQUIREMENT FOR PROTECTIVE WORK CLOTHING & EQUIPMENT (29 CFR 1910.1018(J)).
Work Hygienic Practices: DO NOT WEAR CONTACT LENSES WHEN WORKING W/ CHEMICALS.
Suppl. Safety & Health Data: FIRE FIGHT PROC:OUT. FOR MASSIVE FIRE IN STOR AREA, USE UNMANNED HOSE HOLDER/MONITOR NOZZ, ELSE W/DRAW FROM AREA & LET FIRE BURN. W/DRAW IMMED IN CASE OF RISING SOUND FROM VENTING SAFETY DEVICE/ANY DISCOLORATION OF STOR TANK DUE TO FIRE. EXPLO HAZ:AIR MIXTURES ARE EXPLOSIVE ABOVE FLASH POINT.

DOD Hazardous Materials Information System
DoD 6050.5-L
AS OF May 1993

FSC: 6850
NIIN: 013173339
Manufacturer's CAGE: 78956
Part No. Indicator: A
Part Number/Trade Name: #56XX SUPERLATIVE CHROME ALUMINUM LINING

General Information

Item Name:
Manufacturer's Name: LEO UHLFELDER COMPANY
Manufacturer's Street: 420 SOU;TH FULTON AVENUE
Manufacturer's P. O. Box:
Manufacturer's City: MT. VERNON
Manufacturer's State: NY
Manufacturer's Country: US
Manufacturer's Zip Code: 10553
Manufacturer's Emerg Ph #: UNKNOWN
Manufacturer's Info Ph #: UNKNOWN
Distributor/Vendor # 1: ACCESSORY CONTROLS & EQUIPMENT CORP.
Distributor/Vendor # 1 Cage: 00365
Distributor/Vendor # 2:
Distributor/Vendor # 2 Cage:
Distributor/Vendor # 3:
Distributor/Vendor # 3 Cage:
Distributor/Vendor # 4:
Distributor/Vendor # 4 Cage:
Safety Data Action Code:
Safety Focal Point: D
Record No. For Safety Entry: 002
Tot Safety Entries This Stk#: 002
Status: SP
Date MSDS Prepared: 21SEP89
Safety Data Review Date: 14SEP90
Supply Item Manager: CX
MSDS Preparer's Name: UNKNOWN
Preparer's Company:
Preparer's St Or P. O. Box:
Preparer's City:
Preparer's State:
Preparer's Zip Code:
Other MSDS Number:
MSDS Serial Number: BHYBJ
Specification Number: NONE
Spec Type, Grade, Class: NOT APPLICABLE
Hazard Characteristic Code: N1
Unit Of Issue: BT
Unit Of Issue Container Qty: 16 OZ
Type Of Container: BT W/SCREWCAP
Net Unit Weight: 16 OZ
NRC/State License Number: N/R
Net Explosive Weight: N/R
Net Propellant Weight-Ammo: N/R
Coast Guard Ammunition Code: N/R

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Ingredients/Identity Information
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Proprietary: NO
Ingredient: ALUMINUM (SARA III)
Ingredient Sequence Number: 01
Percent: 98
Ingredient Action Code:
Ingredient Focal Point: D
NIOSH (RTECS) Number: BD0330000
CAS Number: 7429-90-5
OSHA PEL: 15MG/M3 DUST/5 FUME
ACGIH TLV: 10MG/M3 DUST; 9192
Other Recommended Limit: NONE SPECIFIED
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Physical/Chemical Characteristics
==========
Appearance And Odor: COATED ALUMINIUM POWDER FLAKE
Boiling Point: >4532F
Melting Point: N/R
Vapor Pressure (MM Hg/70 F): N/R
Vapor Density (Air=1): N/R
Specific Gravity: UNKNOWN
Decomposition Temperature: UNKNOWN
Evaporation Rate And Ref: NOT APPLICABLE
Solubility In Water: NEGLIGIBLE
Percent Volatiles By Volume: 0
Viscosity: N/R
pH: N/R
Radioactivity: N/R
Form (Radioactive Matl): N/R
Magnetism (Milligauss): N/R
Corrosion Rate (IPY): N/R
Autoignition Temperature: NONE
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Fire and Explosion Hazard Data
==========
Flash Point: NONE
Flash Point Method: N/R
Lower Explosive Limit: UNKNOWN
Upper Explosive Limit: UNKNOWN
Extinguishing Media: USE ONLY DRY SAND OR SUITABLE COMMERCIAL SUBSTITUTE, NEVER WATER.
Special Fire Fighting Proc: FIRE FIGHTERS SHOULD USE NIOSH APPROVED SCBA & FULL PROTECTIVE EQUIPMENT WHEN FIGHTING CHEMICAL FIRE.
Unusual Fire And Expl Hazrds: CONTACT WITH WATER LIBERATES HIGHLY FLAMMABLE GASES.
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Reactivity Data
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Stability: YES
Cond To Avoid (Stability): NOT APPLICABLE
Materials To Avoid: CONTACT WITH WATER LIBERATES HIGHLY FLAMMABLE GASES.
Hazardous Decomp Products: WHEN BURNED, AL IS TRANSFORMED INTO ALUMINIUMOXIDE; AN INERT AND NON HAZARDOUS SUBSTANCE.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT APPLICABLE

Health Hazard Data

LD50-LC50 Mixture: LD50 (ORAL RAT) IS UNKNOWN
Route Of Entry - Inhalation: NO
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: ACUTE: RESPIRATORY TRACT IRRITATION AS DUST. CHRONIC: NONE.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: THIS PRODUCT IS NOT LISTED BY IARC, NTP, OR OSHA AS A CARCINOGEN.
Signs/Symptoms Of Overexp: RESPIRATORY TRACT IRRITATION.
Med Cond Aggravated By Exp: PERSONS WITH A HISTORY OF AILMENTS OR WITH A PRE-EXISTING DISEASE INVOLVING THE RESPIRATORY TRACT MAY BE AT INCREASED RISK FROM EXPOSURE.
Emergency/First Aid Proc: INHALATION:REMOVE TO FRESH AIR. GIVE OXYGEN IF BREATHING IS DIFFICULT .GET MEDICAL ATTENTION. EYES:IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR 15 MINUTES (OPEN EYELIDS). GET MEDICAL ATTENTION. SKIN:REMOVE CONTAMINATED CLOTHING. WASH WITH SOAP AND WATER. GET MEDICAL ADVICE IF IRRITATION PERSISTS. INGESTION:DO NOT INDUCE VOMITING. GIVE NOTHING BY MOUTH IF UNCONSCIOUS. GET MEDICAL ATTENTION.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: SWEEP UP AND PUT IN DISPOSAL CONTAINER. COLLECT SPILLAGE WHERE PRACTICABLE, USING DAMP INERT MATERIAL. AVOID ALL SOURCES OF IGNITION.
Neutralizing Agent: NOT APPLICABLE.
Waste Disposal Method: DISPOSAL SHOULD BE MADE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS.
Precautions-Handling/Storing: STORE IN A COOL, DRY, AREA AWAY FROM SOURCES OF IGNITION. KEEP CONTAINERS TIGHTLY CLOSED WHEN NOT IN USE. PROTECT CONTAINERS FROM PHYSICAL DAMAGE.
Other Precautions: DO NOT SMOKE IN WORK AREA. ELIMINATE SPARKS, FLAMES AND OTHER SOURCES OF IGNITION.

Control Measures

Respiratory Protection: WEAR NIOSH/MSHA APPROVED DUST RESPIRATOR.
Ventilation: NONE NORMALLY REQUIRED.
Protective Gloves: NONE NORMALLY REQUIRED.
Eye Protection: SAFETY GLASSES
Other Protective Equipment: NONE NORMALLY REQUIRED.
Work Hygienic Practices: OBSERVE GOOD PERSONAL HYGIENE PRACTICES. LAUNDER CONTAMINATED CLOTHING BEFORE WEARING. KEEP WORK AREA CLEAN.
Suppl. Safety & Health Data: ACCESSORY CONTROLS & EQUIPMENT CORPORATION'S P/N IS 1001788-16

DOD Hazardous Materials Information System
DoD 6050.5-L
AS OF May 1993

FSC: 9510
NIIN: 00N031080
Manufacturer's CAGE: 86290
Part No. Indicator: A
Part Number/Trade Name: ALUMINUM-BASE ALLOYS

General Information

Item Name:
Manufacturer's Name: COULTER STEEL & FORGE CO
Manufacturer's Street: 1494 - 67TH STREET
Manufacturer's P. O. Box: 8008
Manufacturer's City: EMERYVILLE
Manufacturer's State: CA
Manufacturer's Country: US
Manufacturer's Zip Code: 94662-0901
Manufacturer's Emerg Ph #: 415-653-2512; 800-648-4884
Manufacturer's Info Ph #: 415-653-2512; 800-648-4884
Distributor/Vendor # 1:
Distributor/Vendor # 1 Cage:
Distributor/Vendor # 2:
Distributor/Vendor # 2 Cage:
Distributor/Vendor # 3:
Distributor/Vendor # 3 Cage:
Distributor/Vendor # 4:
Distributor/Vendor # 4 Cage:
Safety Data Action Code:
Safety Focal Point: N
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SMJ
Date MSDS Prepared: 06DEC85
Safety Data Review Date: 27MAY92
Supply Item Manager:
MSDS Preparer's Name:
Preparer's Company:
Preparer's St Or P. O. Box:
Preparer's City:
Preparer's State:
Preparer's Zip Code:
Other MSDS Number:
MSDS Serial Number: BPGYF
Specification Number:
Spec Type, Grade, Class:
Hazard Characteristic Code: NK
Unit Of Issue:
Unit Of Issue Container Qty:
Type Of Container:
Net Unit Weight:
NRC/State License Number:
Net Explosive Weight:
Net Propellant Weight-Ammo:
Coast Guard Ammunition Code:

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Ingredients/Identity Information
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Proprietary: NO
Ingredient: ALUMINUM (SARA III)
Ingredient Sequence Number: 01
Percent: 89-100
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: BD0330000
CAS Number: 7429-90-5
OSHA PEL: 15 MG/M3 DUST;5 RESP
ACGIH TLV: 10 MG/M3 DUST;5 FUME
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: COPPER; (CU) (SARA III)
Ingredient Sequence Number: 02
Percent: 0-7
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: GL5325000
CAS Number: 7440-50-8
OSHA PEL: 0.1MG/M3 FUME;1 DUST
ACGIH TLV: 0.2MG/M3 FUME;1 DUST
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: IRON (III) OXIDE; (IRON) (FE)
Ingredient Sequence Number: 03
Percent: 0-1
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: NO7400000
CAS Number: 1309-37-1
OSHA PEL: 10 MG/M3 (FE)
ACGIH TLV: 5 MG/M3 (FE)
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: MAGNESIUM OXIDE; (MAGNESIUM)
Ingredient Sequence Number: 04
Percent: 0-5
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: OM3850000
CAS Number: 1309-48-4
OSHA PEL: 10 MG/M3 FUME
ACGIH TLV: 10 MG/M3 FUME
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: NICKEL; (NI) (SARA III)
Ingredient Sequence Number: 05
Percent: 0-1.5
Ingredient Action Code:
Ingredient Focal Point: N

NIOSH (RTECS) Number: QR5950000
CAS Number: 7440-02-0
OSHA PEL: 1 MG/M3
ACGIH TLV: 1 MG/M3
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: MANGANESE; (MN) (SARA III)
Ingredient Sequence Number: 06
Percent: 0-1.5
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: OO9275000
CAS Number: 7439-96-5
OSHA PEL: 5 MG/M3 DUST
ACGIH TLV: 5 MG/M3 DUST
Other Recommended Limit: 1 MG/M3;3 STEL(FUME)

Proprietary: NO
Ingredient: ZINC; (ZN) (SARA III) (LIMITS GIVEN FOR ZN OXIDE)
Ingredient Sequence Number: 07
Percent: 0-6
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: ZG8600000
CAS Number: 7440-66-6
OSHA PEL: 10 MG/M3;5 RESP
ACGIH TLV: 10 MG/M3
Other Recommended Limit: 5 MG/M3 FUME

Proprietary: NO
Ingredient: SILICON; (SI)
Ingredient Sequence Number: 08
Percent: 0-1
Ingredient Action Code:
Ingredient Focal Point: N
NIOSH (RTECS) Number: VW0400000
CAS Number: 7440-21-3
OSHA PEL: 10MG/M3 TDUST;5 RESP
ACGIH TLV: 10 MG/M3 TDUST
Other Recommended Limit: N/K
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Physical/Chemical Characteristics

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Appearance And Odor: ODORLESS SOLIDS W/METALLIC LUSTER.
Boiling Point: N/K
Melting Point: N/K
Vapor Pressure (MM Hg/70 F): N/K
Vapor Density (Air=1): N/K
Specific Gravity: N/K
Decomposition Temperature: N/K
Evaporation Rate And Ref: N/K
Solubility In Water: N/K
Percent Volatiles By Volume: N/K
Viscosity:
pH: N/K
Radioactivity:

Form (Radioactive Matl):
Magnetism (Milligauss):
Corrosion Rate (IPY): N/K
Autoignition Temperature:

Fire and Explosion Hazard Data

Flash Point: NONFLAMMABLE
Flash Point Method: N/K
Lower Explosive Limit: N/K
Upper Explosive Limit: N/K
Extinguishing Media: MEDIA SUITABLE FOR SURROUNDING FIRE (FP N).
Special Fire Fighting Proc: WEAR NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT (FP N).
Unusual Fire And Expl Hazrds: NONE SPECIFIED BY MANUFACTURER.

Reactivity Data

Stability: NO
Cond To Avoid (Stability): NONE SPECIFIED BY MANUFACTURER.
Materials To Avoid: NONE SPECIFIED BY MANUFACTURER.
Hazardous Decomp Products: CAUTION MUST BE TAKEN WHEN WELDING BECAUSE OF FUMES & GASES.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT

Health Hazard Data

LD50-LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: ACUTE:METALLIC TASTE; NAUS; TIGHTNESS OF CHEST; FEVER; IRRIT OF EYES, NOSE, THROAT & SKIN; LOSS OF CONSCIOUSNESS/ DEATH FROM WELDING GASES/LACK OF O*2. CHRONIC:ADVERSE EFTS MAY RESULT FROM LONG-TERM EXPOS TO WELDING FUMES, GASES/DUSTS. EFTS MAY INCL SKIN SENSIT, NEUROLOGICAL DMG & RESP DISEASE SUCH AS (EFTS OF OVEREXP)
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NICKEL:IARC GRP 1, NTP ANTICIPATED TO BE A CARCINOGEN.
Signs/Symptoms Of Overexp: HLTH HAZ:BRONCHIAL ASTHMA, LUNG FIBROSIS OR PNEUMOCONIOSIS. MANGANESE CAN CAUSE COMPULSIVE BEHAVIOR, MASK-LIKE FACE & PARKINSON-LIKE SYNDROME.
Med Cond Aggravated By Exp: AGGRAVATION OF PREEXISTING RESPIRATORY OR ALLERGIC CONDITIONS MAY OCCUR IN SOME WORKERS.
Emergency/First Aid Proc: INHAL:REMOVE VICTIM FROM EXPOS & GET PROMPT MED ATTN. IF VICTIM IS UNCON, ADMIN O*2. IF NOT BRTHG, RESUSCITATE IMMED. INGEST:NOT APPLICABLE. EYES:IMMED FLUSH W/POTABLE WATER FOR MINIMUM OF 15 MINUTES, SEEK ASSISTANCE FROM MD (FP N). SKIN:FLUSH W/COPIOUS AMOUNTS OF WATER. CALL MD (FP N).

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: NOT APPLICABLE
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.

Waste Disposal Method: IT IS RECOMMENDED THAT ALL SCRAP GENERATED BE RECLAIMED & SUBSEQUENTLY RECYCLED. DISPOSAL MUST BE I/A/W FEDERAL, STATE & LOCAL REGULATIONS (FP N).
Precautions-Handling/Storing: NONE SPECIFIED BY MANUFACTURER.
Other Precautions: NONE SPECIFIED BY MANUFACTURER.

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Control Measures

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Respiratory Protection: WHEN EXPOSURE LIMITS ARE EXCEEDED, USE PROPER NIOSH/MSHA APPROVED RESPIRATOR VENTILATION.
Ventilation: USE LOCAL EXHAUST WHEN CUTTING, GRINDING OR WELDING.
Protective Gloves: IMPERVIOUS GLOVES (FP N).
Eye Protection: CHEMICAL WORKERS GOGGLES (FP N).(SUPDAT)
Other Protective Equipment: PROTECTIVE CLOTHING SHOULD BE USED WHEN CUTTING, GRINDING OR WELDING.
Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER.
Suppl. Safety & Health Data: EYE PROT:APPROPRIATE EYE PROTECTION SHOULD BE USED WHEN CUTTING, GRINDING, WELDING.

APPENDIX H
REFERENCES

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REFERENCES

U.S. Environmental Protection Agency, Standard Operating Safety Guides, November 1984.

NIOSH, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, NIOSH 85-115, 1985.

Title 29 of the Code of Federal Regulations, Part 1910 (29 CFR 1910), Occupational Safety and Health Standards (OSHA), with special attention to Section 1910.120, Hazardous Waste Operations and Emergency Reponse, (HAZWOPER).

Title 29 of the Code of Federal Regulations, Part 1926 (29 CFR 1926), Safety and Health Regulations for Construction (OSHA).

National Oil and Hazardous Substances Contingency Plan.

The Earth Technology Corporation, Work Plan for Woodbridge Research Facility, Draft, June 1993.

Roy F. Weston, Inc., Enhanced Preliminary Assessment, Woodbridge Research Facility, March 1992.